Space Stations and the Law: Selected Legal Issues

Background Paper

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PREFACE

Multinational space station activities will raise fundamental legal issues. The laws we take for granted on Earth--e.g., those that regulate commerce, property, criminal activity, and personal interactions--may not be available in space or may conflict with similar laws held by other nations. This background paper analyzes some of the legal consequences of developing and operating an international space station. It describes the different ways that an international space station might be owned and operated and explains how each could affect the rights and responsibilities of the U.S. Government and its citizens. The background paper gives special attention to the application of jurisdiction, tort law, intellectual property law, and criminal law to nations and individuals living and working in space. In addition to these specific legal issues, the paper also examines the role of politics and technology in legal decisionmaking, the usefulness of air law and maritime law analogies, and the conflict between State and Federal law and jurisdiction in the United States.

This background paper was requested by the Senate Committee on Commerce, Science, and Transportation as a follow-on to the OTA assessments of *Civilian Space Stations and the U.S. Future in Space* which was published in 1984, and *International Cooperation and Competition in Civilian Space Activities* which was published in 1985. The original space station assessment was requested by the Senate Committee on Commerce, Science, and Transportation and the House Committee on Science and Technology, and was endorsed by the House Committee on the Budget and the Senate Committee on Appropriations. The report on cooperation and competition in space technology was requested by the House Committee on Science and Technology and the Joint Economic Committee.

This report suggests that Congress need not wait for the completion of the current governmental negotiations in order to begin an examination of the legal issues resulting from space station development and operation. In the near term, Congress could: 1) begin to identify those Federal and State laws which already apply to space station activities and those that Congress believes should apply; 2) begin to resolve questions of power sharing between Federal and State laws and Federal and State courts as they relate to space station activities; and 3) monitor the space station negotiations to ensure that the final space station agreements protect the fundamental rights and interests of U.S. citizens and support U.S. policies, including those related to commercial activities in space.

OTA was assisted in the preparation of this background paper by many outside advisors and reviewers, including international legal experts from the U.S. Government, Europe, Canada, and Japan, as well as U.S. legal experts from academia, industry, private practice, and the government. We express sincere appreciation to each of these individuals and organizations. As with all OTA reports, the content of this background paper is the sole responsibility of the Office of Technology Assessment and does not necessarily represent the views of outside advisors or reviewers.

Related OTA Reports

Civilian Space

- *International Cooperation and Competition in Civilian Space Activities.* OTA-ISC-239, June 1985. GPO stock #052-003-00958-7.
- *Civilian Space Stations and the U.S. Future in Space.* OTA-STI-241, November 1981. GPO stock #052-003-00969-2.
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Executive Summary

I - INTRODUCTION

The United States, with the cooperation of the European Space Agency (ESA), Canada, and Japan, is planning to build a space station by the mid-1990s. The habitable portions of the space station will be composed of separate but interconnected modules. Current plans call for the United States to build two of these habitable modules while ESA and Japan will each contribute an additional module. One of the U.S. modules will supply essential living facilities (i.e., areas for recreation, sleeping, and eating) while the other modules will be used as multipurpose laboratories for materials processing, life sciences, fluid physics, and other types of research. Canada plans to supply a mobile servicing facility that will be attached to the space station truss structure and will assist with space station construction and payload and satellite servicing. In addition to the manned base, current plans for the space station envisage the development of unmanned platforms in near-polar orbits and extensive ground support facilities.[1]

Recognizing that the development of a multinational space station would raise legal issues that "could have a significant long-term effect on the Nation's civilian space program," the Senate Committee on Commerce, Science and Transportation asked the Office of Technology Assessment to examine these issues.[2]

In response to the Senate Commerce Committee request, OTA prepared a background paper which discusses the legal consequences of developing and operating the space station. This background paper examines the different ways in which a multinational space station might be owned and operated and explains how each could affect the rights and responsibilities of the U.S.

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[1] The Phase B Memorandum of Understanding (Memorandum of Understanding Between the National Aeronautics and Space Administration and the European Space Agency for the Conduct of Parallel Detailed Definition and Preliminary Design Studies Leading Toward Further Cooperation in the Development, Operation and Utilization of a Permanently Manned Space Station, June 3, 1985) defines the space station as "a multi-purpose, permanent facility in low-Earth orbit, comprised of both manned and unmanned elements, that will significantly enhance space operations. It will consist of a manned base, associated man-tended platforms in low inclination and polar orbits, and a transfer vehicle for use as necessary between the Space Shuttle, the manned base and the associated platforms."

[2] Letter from Senators John C. Danforth, Slade Gorton, Ernest Hollings, and Donald W. Riegle, Jr., Senate Committee on Commerce, Science, and Transportation, to John H. Gibbons, Director, Office of Technology Assessment, Apr. 22, 1985.

Government and its citizens. In addition, it gives special attention to the application of jurisdiction, tort law, intellectual property, and criminal law to nations and individuals living and working in space. The OTA background paper is Part I of this document.

Part II of this report is a summary of the workshop held by OTA to critique and expand on the initial drafts of Part I. In particular, Part II addresses the fundamental issues of timeliness of government intervention, the role of politics and technology in legal decisionmaking, the usefulness of air law and maritime analogies, and the conflict between State and Federal law and jurisdiction in the United States. In addition, new topics such as export law and product liability law are introduced though not critically discussed.

Although Parts I and II address the same subject matter, they do so from different perspectives and therefore offer different insights. This Executive Summary draws freely from the findings of both.

II - PRINCIPAL FINDINGS

Laws we take for granted on earth--e.g., those which regulate commerce, property, and personal interactions--may not be available in space.

For the last several years, the U.S. Congress has been trying to determine whether the patent laws of the United States already apply in space or whether additional legislation is needed. In 1981, Congress faced this same question with respect to Federal criminal law and decided to amend the Criminal Code to remove any confusion on this point. These two examples illustrate the simple fact that terrestrial laws do not necessarily apply to space activities. This may be because the law in question has no "extraterritorial application"--an argument sometimes made with respect to the patent laws--or because the law, as written, makes no sense when applied to space activities. The Uniform Commercial Code (UCC) provides an example of this latter problem. The UCC is essential to U.S. commerce, but many of its provisions--such as the definitions of personal property and real estate, or its definitions of what is movable and immovable--cannot be applied to the space station without serious uncertainty.

Many informed observers believe that the success of space station operation and space commerce will both depend on the extension to space of many of the laws we currently have on earth. Ideally, whether a law is applied to space should depend on whether it is practical and useful to do so. For example, the Fair Labor Standards Act and its restrictions (e.g., the 8 hour work day) might seem inappropriate to space activities. On the other hand, legislation such as the Death on the High Seas Act might be desirable since it could be used to remove wrongful death actions from the jurisdiction of States, thereby solving in advance the problem of conflicting State laws.[3]

For existing and future laws, it will be important to determine: *1) whether it is desirable to apply a specific law to space activities; 2) whether the law, as written, can be applied to space activities; and 3) what legislative or regulatory modifications will be necessary to ensure that the protections of the relevant law are available to, or denied, individuals living and working in space.*

Uncertainty with respect to the application of certain laws (e.g., intellectual property, product liability, and export law) could inhibit

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[3] The wrongful death statutes of States differ considerably. Many States use a strict liability standard for wrongful death, while others use a negligence standard. Potential conflicts would be avoided if the Federal law was held to control. The Death on the High Seas Act limits recovery to pecuniary losses. The wrongful death statutes of many States allow for loss of consortium or anguish of next of kin.

private, commercial space activities on the space station.

Whether a firm chooses to conduct space research or to market a space product will depend in part on the potential for damage claims under the relevant product liability laws, the ability to protect--either through patent or trade secret laws--the result of the firm's investment, and the administrative complexity and cost of getting the product to market. In order to assess these variables, a firm must know which nation's--and in the United States, which State's--laws would apply to a potential product and what the likely outcome of a controversy would be.

There must be some way to determine which of the hundreds of existing laws that might be applied to the space station will actually be so applied. For example, the Fair Labor Standards Act--and its 8 hour work day--does not now apply to NASA employees; whether it will apply to other people working in space has yet to be determined. The wisdom of applying to space activities the Federal Tort Claims Act, Buy-America Act, U.S. export laws, patent laws, tax laws, and many other pieces of legislation is equally unclear.

To encourage private, commercial space activities, the U.S. Government may wish to help firms determine which Federal and State laws will govern their activities. Congress could undertake a general assessment of the applicability of current Federal and State laws, or, alternatively, it could direct some independent group of legal experts to begin this task.

Determining jurisdiction is the most important issue to resolve during the planning stage for the space station.

Many of the issues discussed in this paper involve questions of "jurisdiction"; that is, questions concerning a State's right to prescribe and enforce rules of law. The nature and extent of U.S. jurisdiction over a space station will strongly influence when U.S. laws could be applied, what unilateral actions the United States might take, and the rights and obligations of foreign nationals. For all multinational space station endeavors, the question of whether the United States has jurisdiction in a particular instance will depend, in major part, on the terms of the relevant space station agreement.

The international partners could agree that the space station is to be: 1) *a national space station*, under the jurisdiction and control of one country; 2) *a multinational space station*, under the joint jurisdiction and control of several nations; 3) *a multinational space station*, the individual modules of which are under the jurisdiction and control of separate nations; or 4) *an international space station*, under the jurisdiction and control of an international governmental organization similar to INTELSAT. The rights and responsibilities of the U.S. Government and its citizens, the jurisdiction of U.S. courts, and the lawmaking powers of Congress could differ under each of these regimes.

U.S. law could be more easily applied and enforced if all space station

components were under U.S. jurisdiction; however, such a solution may be politically unacceptable to the other space station partners.

If the United States were to be the sole owner and operator of the space station, it would be a relatively simple matter to extend U.S. law to cover space station activities. However, should the United States choose to retain sole jurisdiction over the space station, it is not clear whether other countries would wish to continue their participation in this program. Nations considering investing a substantial portion of their financial, technical, and human resources in a space station will most likely wish to retain some type of control over their contributions. With respect to the European partners, this assumption seems to have been confirmed by the Rome Resolution of 1985,[4] and by the positions they have taken in the ongoing space station negotiations.

Most experts believe that the United States should not attempt to fashion a novel 'space code' to cover all space station activities; rather, legal problems should be addressed incrementally by the careful application of intergovernmental agreements, congressional action in the form of legislation, and, finally, court decisions.

Most legal experts consulted by OTA agreed that it was time to begin an examination of the problems presented by multinational space station operation, but that such an examination should proceed slowly, taking into consideration the technical demands of building large, permanently manned space structures, the political demands of multinational management, and the eventual need to establish a "backdrop" of laws and regulations necessary to protect those who live and work in space.

Legal experts were almost uniformly skeptical of the need for new international treaties or national 'space codes.' However, many thought that a systematic investigation of space station legal issues would reveal that creative multinational agreements or selective domestic legislation would be in order. Areas that were identified as needing prompt attention include: jurisdiction, conflicts of law, power sharing between the U.S. Congress and the 50 States, and power sharing between Federal and State courts.

Experts agree that as people begin to live and work in space, Congress will be called on to resolve many complex legal issues; however, they disagree on whether such issues must be resolved now or after they result in a mature case or controversy.

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[4] The Rome Resolution, for example, declares that a "fundamental objective" of European participation would be European "responsibility for the design, development, exploitation and evolution of...identifiable elements of the space station together with the responsibility for their management..." "Resolution on Participation in the Space Station Programme," The ESA Council, meeting at Ministerial level (Jan. 31, 1985; ESA/C-M/LXVII/Res. 2).

Most legal experts agree that, over the next several decades, a body of law for space will develop that will serve the function that maritime law now serves for the seas. Experts are divided, however, on the question of whether domestic and international law should respond to immediate problems, or attempt to prevent problems from occurring. Proponents of responsive legislation maintain that laws affecting space should be developed incrementally, in response to the increased use of space by the private sector, advances in technology, judicial interpretations, and international political and legal pressures. They argue that domestic and international laws developed from "best guesses" about the future may unnecessarily restrict our technical and commercial options. Proponents of preventive legislation point out that the current legal uncertainty decreases the private sector's interest in investing in space and offers no guidance to courts that may eventually be asked to resolve space station-related cases. In particular, they point out the need to resolve questions of product liability, personal injury, intellectual property, and export law. Inherent in this position is the belief that current NASA regulations would not adequately protect the interests of space workers who are not government employees.

Since U.S. laws could conflict with the laws of other nations, special conflict rules may need to be developed for the space station.

Current international space agreements do not attempt to instruct courts as to which body (or bodies) of law should be applied to cases and controversies arising from space activities. Between sovereign nations, 'choice of law' and 'conflict of law' questions may not be particularly important since the resolution of an issue is likely to be accomplished by diplomatic negotiation. These questions will be much more important to private firms whose business decisions may be predicated on an understanding of the liability and financial risk of a given space venture.

'Choice of law' rules vary from country to country. Many countries designate the law of the place where the activity or injury occurred as the substantive law for tort and contract cases. Other countries rely on the law where the case is brought, and still others (the predominant view in the United States) look to the country with the most substantial contacts. The application of any of these rules to a space station under the jurisdiction and control of several nations would be difficult.

To the extent that 'conflict of law' problems could adversely affect the success of the space station, every effort must be made to achieve some type of international coordination. In the short run, such coordination will probably take the form of prelaunch contracts that either establish applicable rules of law or provide for arbitration.

Some experts believe that international conventions addressing the question of 'conflict of law' in space and, perhaps, additional international treaties may eventually be necessary. Others maintain that, instead of trying to solve 'conflict of law' problems in advance, nations should handle them on a case-by-case basis and encourage the development of a customary law of space conflicts. They acknowledge that such a course might be chaotic at first, but believe that it could encourage creative solutions to traditional problems.

> **Prelaunch agreements similar to NATO's "Status of Forces Agreements" might help resolve complex jurisdictional and choice of law issues on the space station.**

The nations of the North Atlantic Treaty Organization (NATO) have developed a complex set of agreements (Status of Forces Agreements) to resolve questions of jurisdiction and control with respect to troops stationed in the various NATO countries. These "Status of Forces Agreements" could provide a useful model for resolving similar issues on a space station. The NATO Agreements divide jurisdiction among different countries depending on the type of offense committed (e.g., civil or criminal), where it was committed (on or off the military base), whether it was committed while on "official duty," and other criteria. Sometimes these agreements grant the host countries exclusive jurisdiction over specific issues and, with respect to other issues, jurisdiction is concurrent. Where concurrent jurisdiction exists, one nation may be given primary jurisdiction--which may be waived at its discretion--in favor of some other nation. Such negotiated agreements would be useful whether jurisdiction and control of the space station were held by one nation or shared between several nations.

> **Nations must exercise caution when applying their domestic laws to the space station.**

'Conflict of law' rules will not resolve all the problems that could result from the application of domestic laws to space station activities. For example, with respect to inventions made in the United States, the U.S. Inventions Secrecy Act requires patent applicants either to file first in the United States or to request an exemption from the Act. At the present time, a foreign astronaut who reduces an idea to practice on a space station over which the United States claims jurisdiction must file first for a U.S. patent or an exemption, or risk having a subsequent U.S. patent declared invalid.

There is no easy way to discover all the inconsistencies in all the laws of the space station partners prior to the signing of the first round of space station agreements. However, a modest effort, if started now, could, when combined with the practical experience gained in the construction and early operation of the space station, help to identify most significant conflicts. Once discovered, such conflicts could be resolved on a case-by-case basis through international agreements and domestic legislation.

> **The United States must determine how the right to make laws and adjudicate cases and controversies will be shared between the Federal Government and the various State Governments with respect to space station activities.**

In the United States, most laws affecting the rights of individuals (e.g., personal injury, contracts, property, wills and estates, employee's compensation, etc.) are State laws, not Federal laws. In addition, under the doctrine of *Erie v. Tompkins*,[5] Federal courts must apply State law in many cases.

Because the substance of State laws varies considerably, it is essential that the jurisdiction of State courts and the applicability of State law to space station activities be determined clearly. This will involve deciding: 1) whether the grant of jurisdiction over 'space-related' cases is exclusively limited to Federal courts or is shared with the States; 2) whether the individual States will be allowed to pass laws affecting space station activities; and 3) how to apply the doctrine of *Erie v. Tompkins* to space activities.

> **Analogies drawn from air law and maritime law can provide useful examples; however, the radical differences between the air, sea, and space environments may make it unwise to try to apply the same laws to these different regimes.**

Since the beginning of the space age lawyers have debated whether and to what extent the legal principles found in air law and maritime law could be applied to outer space activities. Most legal experts agree that air and sea law could not be transferred wholesale to the realm of space. However, many believe that analogies drawn from air and sea law could assist in the development of a unique body of space law. Although such analogies could not accurately reflect the unique technological and political circumstances of the space station, certain legal aspects of interpersonal relationships may be similar. For example, how nations compensate injuries, keep track of and transfer personal property, delegate authority, and punish minor wrongs on the space station need not differ substantially from their practices in the air or on the high seas.

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[5] 304 U.S. 64 (1938).

III - CONCLUSIONS

Congress and the judiciary can expect to play a major role in the implementation of the space station agreement currently being negotiated by the executive branch. In addition to the oversight function it exercises with respect to NASA, Congress will be called on to decide which of the existing laws already apply to space, what new laws are necessary to protect U.S. nationals living and working in space, and how to best encourage commercial activities on the space station. The judiciary will be left to unravel what at first could be daunting jurisdiction and conflict of law problems, and, to the extent that it is not done by Congress, to develop specific rules for space-related product liability, contract, intellectual property and other suits.

Congress need not wait for the completion of the space station agreement to begin to examine the issues discussed in this paper. In the near term, three tasks can be identified that would benefit greatly from congressional attention:

1. Congress could begin to identify those Federal and State laws which already apply to space and those laws which Congress believes should apply to space;
2. Congress could begin to resolve the questions of power-sharing between Federal and State laws and between Federal and State courts as they relate to space station activities; and
3. Congress could monitor the space station negotiations to ensure that the final space station agreements protect the fundamental rights and interests of U.S. citizens and support U.S. policies, including those related to commercial activities in space.

Should Congress choose to undertake these tasks, it could benefit greatly by drawing on the experience of a wide range of international and domestic lawyers. To obtain such a range of experience, Congress may wish to encourage professional societies, such as the American Bar Association, the American Society of International Law, or the International Institute of Space Law, to form working groups to examine the legal implications of space station development and operation.

Part I
Background Paper

I - INTRODUCTION

A. Purpose and Scope

Space station activities will be affected by *international law*, (customary international law, treaties, and other international agreements); *national space law* (laws to encourage scientific or commercial space activities or to regulate or establish new space industries); and, *ordinary domestic law* (e.g., criminal law, contract law, tort law, etc.).

This paper is primarily concerned with international law and regular domestic law because these will have the greatest effect on space station operations. National laws designed to encourage commercial space activities or to regulate new space industries (e.g., The Remote Sensing Act and the Space Launch Commercialization Act) are discussed only insofar as they offer interesting insights regarding space station activities. The relationship between military space activities and international law has been discussed in other recent OTA reports.[1]

It is, of course, impossible to describe how every U.S. law would apply to activities aboard a space station. Therefore, this paper examines an illustrative set of legal issues and outlines an analytical means for examining other areas of law. It begins with a brief review of the current international space laws; it then describes the concept of "jurisdiction" and explains how U.S. laws may be applied outside the territory of the United States. After this general discussion, the paper analyzes three specific areas of law that will be critical to space station activities: intellectual property law, criminal law, and tort law.

B. Definition

Before beginning a legal analysis, it is first necessary to clarify just what is meant by *space station*. Is it something more than a *satellite*? Must an object in space be habitable to be considered a space station? Must it be capable of orbiting for a specific duration before it gains the status of space station? Can separate, free-flying space objects (e.g., two separate research modules) be considered as part of one space station? If objects must be attached to be considered a space station, must that attachment be of a relatively permanent nature?

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[1] U.S. Congress, Office of Technology Assessment, *Ballistic Missile Defense Technologies*, OTA-ISC-254 (Washington, DC: U.S. Government Printing Office, September 1985); U.S. Congress, Office of Technology Assessment, *Anti-Satellite Weapons, Countermeasures, and Arms Control*, OTA-ISC-281 (Washington, DC: U.S. Government Printing Office, September 1985).

As explained in detail below, the answers to these questions will help to determine the 'nationality' of space stations and, consequently, the reach of national laws. Although international acceptance of such terms may eventually result from specific agreements and the common practice of states, no such consensus exists today. Lacking such a consensus, this report is forced to adopt an arbitrary definition of "space station."

For the purposes of this report, a space station is an object or a collection of objects (attached or free-flying) which is in an intentional, long-duration earth orbit and is, at least in part, habitable.[2] Under this definition, orbital duration and habitability would be determined by both the actions and the stated intentions of the relevant parties. Space objects would not be considered to be components of a space station unless: 1) the relevant parties make clear, through their statements or actions, that this is their intention; or 2) the technological relationship between the objects is so complete as to make such a determination obvious (e.g., a station's power module).

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[2] This definition would specifically exclude space transportation systems such as the Space Shuttle. This paper does not attempt to define the legal status of interplanetary spacecraft or space stations on or in orbit about celestial bodies other than the Earth.

II - OVERVIEW OF CURRENT LEGAL REGIME

A. Treaties and International Agreements

International law is applicable to space stations for three reasons: first, space has been defined by the Outer Space Treaty as an international realm beyond the sovereign claim of any nation or group of nations[3]; second, article VI of the U.S. Constitution states that: "Treaties made, ... under the Authority of the United States, shall be the supreme Law of the Land"; therefore, U.S. citizens engaged in space activities are bound as a matter of domestic law by self-executing provisions of the space treaties[4]; and third, since the space station currently under consideration by NASA will include some level of international participation, attempts to apply U.S. law to the entire space station will raise questions with an international dimension.

The United States has signed and ratified four international space agreements:[5]

- Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (The Outer Space Treaty, 1967)[6];

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[3] Outer Space Treaty, article I, (18 U.S.T. 2410; T.I.A.S. 6347).

[4] Not all treaties made by the United States immediately become U.S. domestic law. Treaties can be classified as self-executing (those which become domestic law immediately) and nonself-executing (those which require some action on the part of Congress to implement). For two different applications of this rule, see: *Sei Fuji v. State*, 242 P.2d 617, 38 Cal.2d 718 (1952), where the California Supreme Court held that the general purposes and objectives of the the U.N. Charter did not impose legal obligations on the individual member nations or create rights in private persons; and *Asakura v. City of Seattle*, 265 U.S. 332, 44 S.Ct. 515 (1924), where the U.S. Supreme Court held that a local law prohibiting non-citizens from operating as pawnbrokers violated a treaty between the United States and Japan.

[5] The United Nation's Committee on the Peaceful Uses of Outer Space (COPUOS) which was responsible for drafting these four treaties also drafted the "Agreement Governing the Activities of States on the Moon and Other Celestial Bodies" (the Moon Treaty, 1979). Although the United States participated in the drafting of this fifth treaty, it neither signed nor ratified this document.

- Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (The Astronaut Treaty, 1968)[7];
- Convention on International Liability for Damage Caused by Space Objects (The Liability Convention, 1973)[8]; and
- Convention on Registration of Objects Launched into Outer Space (The Registration Convention, 1976)[9].

Most of the fundamental principles of international space law can be found in the 1967 Outer Space Treaty. The 1968 Astronaut Treaty, the 1973 Liability Convention, and the 1976 Registration Convention serve primarily to elaborate some of these general principles. Taken together, these Treaties establish a unique international legal regime for space. Although this subject has been dealt with in greater detail elsewhere[10] it is useful to examine some of the principles that have relevance to the development and operation of a space station.

1) **The Legal Character of Outer Space**. Outer space is considered by most jurists to be *res communis*; that is, a place that is owned by no one but is free for use by everyone. Article II of the 1967 Outer Space Treaty states: "outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means."

Although space may not be "appropriated," it is "free for exploration and use by all States."[11] In some circumstances this "use" may even be

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[6] 18 U.S.T. 2410; T.I.A.S. 6347.

[7] 19 U.S.T. 7570; T.I.A.S. 6599.

[8] 24 U.S.T. 2389; T.I.A.S. 7762.

[9] 28 U.S.T. 695; T.I.A.S. 8480.

[10] *See generally*: Carl Q. Christol, *The Modern International Law of Outer Space*, (Pergamon Press, 1982); *Manual on Space Law*, Jasentuliyana and Lee, eds., (Oceana Publishing, 1979); Nicolas M. Matte, *Aerospace Law*, (Carswell, Ltd., Canada, 1969); Myres S. McDougal, Harold D. Lasswell, and Ivan A. Vlasic, *Law and Public Order in Space*, (Yale University Press, 1963). For a more detailed examination of how the current space treaties relate to space station development and activities, *see:* Eilene Galloway, "The Relevance of General Multilateral Space Conventions to Space Stations," paper delivered to the International Colloquium on Space Stations, Hamburg, Germany, October 3-4 1984; Hamilton DeSaussure, "The Impact of Manned Stations on the Law of Outer Space," *San Diego Law Review*, vol. 21, No. 1, March 1984.

[11] 1967 Outer Space Treaty, *supra*, note 6, article I: "Outer Space, including

exclusive. For example, a country that places a broadcasting satellite in geostationary orbit[12] prevents other countries from placing broadcasting satellites in that identical position in that orbit. Such exclusive use is allowed because it constitutes neither a permanent "appropriation" nor an attempt to extend state sovereignty.[13] A similar situation exists in maritime law. Nations may not claim sovereignty over portions of the high seas; however, when conducting activities such as naval maneuvers, satellite launch or recovery at sea, or missile tests, nations have in the past exercised temporary control over portions of the high seas.[14] In both maritime law and space law, temporary exclusive use is allowed as long as it is accomplished with "due regard" for the corresponding interests of other states.[15]

2) **The Status of Private Sector Space Activities**. There was some initial disagreement as to the legal status of private sector space activities. The United States has always encouraged the private sector to participate in space exploitation.[16] The Soviet Union initially opposed this idea. In 1962, the Soviets introduced a draft treaty which stated: "All activities of any kind pertaining to the exploration of outer space shall be carried out solely and exclusively by States..."[17] In order to resolve this

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the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies."

[12] A circular, equatorial orbit whose period of rotation is equal to the period of rotation of the earth; a satellite in such orbit remains approximately fixed in relation to the Earth.

[13] Some jurists have argued that the "first come, first served" method of allocating orbital slots amounts to an "appropriation" in violation of the Outer Space Treaty. *See:* Ram S. Jakhu, "Legal Aspects of the WARC," *Intermedia,* May 1985, vol. 13, No. 3, p. 17.

[14] States have also recognized the right to establish permanent platforms on the contiguous high seas over the continental shelf. (*Rodrigue v. Aetna Casualty and Surety*, 395 U.S. 352.) As long as these platforms are not a hazard to maritime navigation, they do not contravene international law.

[15] Article IX of the Outer Space Treaty provides that states shall "conduct all their activities in outer space ... with due regard for the corresponding interests of all other states..." Article 87 of the 1982 United Nations Convention on the Law of the Sea states: "[Freedom of the high seas] shall be exercised by all States with due regard for the interests of other States..."

[16] In 1960, President Eisenhower directed NASA to "advance the needed research and development to encourage private enterprise to apply its resources toward the earliest practical utilization of space technology for commercial civil communication requirements." White House Press Release, Dec. 30, 1960.

[17] U.N. Doc. A/AC. 105/L2; U.N. Doc. A/5/81, Annex 3.

conflict, the United States proposed that each country should bear the responsibility for the activities of its nationals in space.[18] This compromise was acceptable to the Soviet Union and was incorporated in article VI of the 1967 Outer Space Treaty.[19]

The space treaties declare that, under certain circumstances, a country is both 'responsible' and 'liable' for the space activities of its nationals. It is important to note that this differs from the common practice in both maritime and air law. The United States exercises a supervisory role (responsibility) with respect to ships and planes owned by the private sector but does not accept the financial risk (liability) for the actions of these assets. In space, under certain circumstances, the U.S. Government has both a supervisory and a financial responsibility.[20]

The principle of state responsibility for the actions of its nationals is incorporated in articles VI and IX of the 1967 Outer Space Treaty. Although the 1967 Treaty does not specifically grant private industry the right to undertake commercial activities in space, the U.N. debates on this subject make it clear that such rights were contemplated by the drafters and, in fact, already existed--at least in the United States--as a result of the 1962 Communication Satellite Act.

3) **State Responsibility for Actions in Space.** Article VI of the Outer Space Treaty states:

> States ... shall bear international responsibility for national activities in outer space, ... whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with ... (this) Treaty. The activities of non-governmental entities in outer space, ... shall require authorization and continuing supervision by the appropriate State party to the Treaty.

Some authors have suggested that a state's responsibilities under article VI are extensive:

> (W)hile no one would doubt the need for government control over space activity at its present stage, ... Article VI would prohibit, as a

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[18] U.N. Doc. A/AC. 105/L5; U.N. Doc. A/5/81, Annex 3.

[19] Article VI of the Outer Space Treaty provides that states shall bear *international* responsibility for the conduct of their nationals in outer space. The United States has not undertaken to bear *domestic* responsibility, *vis-a-vis* its own nationals or their property.

[20] In recognition of this fact, the standard NASA launch service agreement requires the customer to obtain third-party liability insurance to reduce or eliminate the financial exposure of the U.S. Government.

> matter of treaty obligation, strictly private, unregulated activity in space or on celestial bodies even at a time when such private activity becomes most commonplace. Although the terms "authorization" and "continuing supervision" are open to different interpretations, it would appear that Article VI requires a certain minimum of licensing and enforced adherence to government-imposed regulations.[21]

With respect to government or private activities that could "cause potentially harmful interference with activities of other States," a state, under article IX of the Outer Space Treaty, must "undertake appropriate international consultation before proceeding with any such activity." Article IX's language is significant because it can be read as imposing an active duty to regulate, whereas article VI might be read as imposing only a passive duty to supervise.

4) **State Liability for Actions in Space.** Article VII of the Outer Space Treaty and article II of the 1973 Liability Convention extend the concept of State *responsibility* to include the concept of *liability* for certain space activities. Article II of the Liability Convention provides that a launching State is absolutely liable[22] for "damage caused by its space object on the surface of the earth or to aircraft in flight."[23] If the damage does not occur on earth or in the air, then the launching state is "liable only if the damage is due to its fault or the fault of persons for whom it is responsible."[24]

The Liability Convention applies only to "launching states," which are defined in article I as:

> (i) A State which launches or procures the launching of a space object;

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[21] Jasentuliyana and Lee, *Manual of Space Law*, vol. 1, p. 17 *supra*, note 10. However, it might reasonably be argued that the "authorization and continuing supervision" required by registry states relate to treaty compliance and safety, not to the general activities of private firms. A comparison could be made to the present state of U.S. commercial aviation, in that market forces are allowed to dictate fares, rates, and capacity, but the FAA retains sole responsibility for air safety.

[22] There is an important legal distinction between *absolute* liability and *fault* liability. Under an absolute liability standard, the plaintiff need only prove that the incident occurred and that the injury resulted from the incident. Where the standard is fault liability, the plaintiff must also prove that the defendant was at fault, that is, that the defendant acted with negligence.

[23] The Liability Convention does not apply to damage caused by a launching state to its own nationals. This problem is discussed in section VI.

[24] Liability Convention, *supra*, note 8, article III.

(ii) A State from whose territory or facility a space object is launched;

Under this scheme, if state A launches a space object for a private corporation of state B from the territory of state C, states A and C would be considered launching states and therefore absolutely *liable* for damage done on Earth. The question of state B's liability is unclear, even though state B would be *responsible* under article VI of the Outer Space Treaty for the "authorization and continuing supervision" of the private sector party. If state B is considered to have "procured" a launch, then presumably it would also be liable.[25]

The Liability Convention allows an injured party to file a claim against any launching state. Therefore, in the example given above, states A, B, and C might all be held liable. To offset a potentially inequitable outcome, article V of the Liability Convention allows a state that has paid compensation for damages to present a claim for indemnification to other participants in the joint launching.

The Liability Convention grants neither rights nor responsibilities to the private sector. If the nationals of a launching state cause damage to the nationals of another state, the damaged party must have its government present a claim for compensation to the government of the launching party.[26] The Convention does, however, acknowledge the right of individuals to pursue remedies outside the Convention.[27]

5) **State Jurisdiction Over Space Objects.** The 1967 Outer Space Treaty establishes the principle that "A State ... on whose registry an object launched into space is carried shall retain jurisdiction and control over such object and over any personnel thereof, while in outer space or on a celestial body."[28] In other words, the rights and responsiblities of the state of registry of a space object are similar--though not identical--to those of the

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[25] Article VI of the Outer Space Treaty holds a state responsible for the actions of its nationals; however, it does not say that the action of a national is identical to the action of the state. In the example above, if state B's nationals procure a launch, it is not immediately clear that state B has procured a launch. Therefore, although state B would be *responsible*, it might not be *liable* for the actions of its nationals. It is interesting to note that the 1973 NASA/ESA Spacelab Agreement (24 U.S.T. 2049; TIAS 772) is also ambiguous with respect to these terms. Article 11 is entitled "Liability" but the article speaks only of "responsibility."

[26] Liability Convention, *Ibid.*, article VIII.

[27] Article XI (2) states: "Nothing in this Convention shall prevent a State, or natural or juridical persons it might represent, from pursuing a claim in the courts or adminstrative tribunals or agencies of a launching State."

[28] 1967 Outer Space Treaty, *supra*, note 6, article VIII.

state of registry of a ship.

In addition to the registries of the individual launching states mentioned in the Outer Space Treaty, the Registration Convention instructs the Secretary-General of the United Nations to maintain a separate registry. States on whose registry a space object is recorded are to notify the Secretary-General "as soon as practicable" of the:

(a) Name of launching State or States;
(b) [A]ppropriate designator of the space object or its registration number;
(c) Date and territory or location of launch;
(d) Basic orbital parameters...;
(e) General function of the space object;[29]

Where two or more states might be considered "launching states," article II of the Registration Convention provides that "they shall jointly determine which one of them shall register the object."[30] Although only one of the parties can register the object, article II acknowledges that the registration decision is "without prejudice to appropriate agreements concluded or to be concluded among the launching States on jurisdiction and control over the space object and over any personnel thereof."

B. U.S. Space Law

Until recently, U.S. space law--excluding telecommunication law[31]--consisted primarily of regulatory interpretations of the 1958 National Aeronautics and Space Act.[32] When U.S. space exploration began, domestic space laws were not as important as they are now, since the government was the primary actor in space. NASA, working with private contractors, developed the technologies that it needed to conduct its research; these technologies form the basis of what are now the infant space transportation, remote sensing, and materials processing in space (MPS) industries.

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[29] Registration Convention, *supra*, note 9, article IV.

[30] Registration Convention, *supra*, note 9, article II.

[31] The 1962 Communication Satellite Act (47 U.S.C. 701 *et seq.*), which established COMSAT as a private corporation and the U.S. participant in INTELSAT, is one of the most significant pieces of domestic legislation affecting space activities. However, this paper does not address problems of communications law. For a discussion of current political and legal issues in satellite communications, see, U.S. Congress, Office of Technology Assessment, *International Cooperation and Competition in Civilian Space Activities*, OTA-ISC-239 (Washington, DC: U.S. Government Printing Office, July 1985) Chapter 6.

[32] 42 U.S.C. Sec. 2451, *et seq.*

Following the completion of the Apollo program, the emphasis of the U.S. space program began to shift from achieving technological superiority over the Soviet Union and solar system exploration to the pursuit of programs with more obvious earth-oriented benefits. In 1978, President Carter announced that the United States would "encourage domestic commercial exploitation of space ... for economic benefit ..."[33] The Reagan Administration has continued and expanded the Carter policy of encouraging commercial space activities.

In a relatively short period of time, the U.S. private sector began to generate proposals for private launch, remote sensing, and materials processing services.[34] As each of these technologies raised a different set of legal issues, pressure began to build to develop legislation specifically crafted to each technology. In 1984, Congress passed and the President signed into law the Land Remote-Sensing Commercialization Act[35] and the Commercial Space Launch Act.[36] These bills were designed to encourage the development of private remote sensing and space transportation industries and to establish the minimum but essential level of government regulation required by article VI of the 1967 Outer Space Treaty.

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[33] White House Press Release, "Description of a Presidential Directive on National Space Policy," June 20, 1978.

[34] For a detailed look at the history and current structure of each of these industries, *see*: *International Cooperation and Competition in Civilian Space Activities*, *supra*, note 31; *see also:* U.S. Congress, Office of Technology Assessment, *Civilian Space Policy and Applications*, OTA-STI-177 (Washington, DC: U.S. Government Printing Office, June 1982).

[35] Public Law 98-365; *See also*: Richard DalBello, "The Land Remote Sensing Commercialization Act of 1984," *Space Policy*, August 1985.

[36] Public Law 98-575; *See also*: E. Jason Steptoe, "Regulation of Private Commercial Space Transportation by the United States Department of Transportation," American Institute of Aeronautics and Astronautics, *Proceedings of the Twenty-Eighth Colloquium on the Law of Outer Space*, 1985.

III - JURISDICTION OVER SPACE STATION ACTIVITIES

The nature and extent of U.S. jurisdiction over a space station will determine when U.S. laws could be applied, what unilateral actions the United States may take in space, and the rights and obligations of foreign nationals. This section examines the concept of jurisdiction and explains how it might be applied to private and government-owned space stations.

A. The Concept of Jurisdiction

Jurisdiction is a legal concept used to describe a state's right to take action--e.g., to prescribe and enforce rules of law--with respect to a particular person, thing, or event. In its inception, the principle of jurisdiction was primarily territorial, deriving from the belief that the power of a nation to act within its own borders was "necessarily exclusive and absolute ... susceptible of no limitation not imposed by itself."[37] But the actions of nations have rarely been limited to their territory. As a result of international trade and travel, and military and political cooperation and competition, the concept of jurisdiction had to expand to comprehend the myriad interactions of states.[38]

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[37] Comments of Chief Justice Marshall in *Schooner Exchange v. McFaddon*, 7 Cranch 116, 136 (U.S. 1812).

[38] Although there are many jurisdictional rationales, all require that there be some genuine link between the state and the persons, property, or events over which jurisdiction is claimed.

> "States have traditionally sought to assert jurisdiction on certain bases or principles. As usually identified, these include:
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> 1. *The Territorial Principle* - A state may exercise jurisdiction with respect to an act occurring in whole or in part in its territory.
> 2. *The Nationality Principle* - A state may exercise jurisdiction with respect to its own national, wherever he may be.
> 3. *The Protective Principle* - A state may exercise jurisdiction with respect to certain types of acts wherever, and by whomever, committed where the conduct substantially affects certain vital state interests, such as its security, its property, or the integrity of its governmental process.
> 4. *The Universality Principle* - A state may exercise jurisdiction with respect to certain specific universally condemned crimes, principally piracy, wherever and by whomever committed, without regard to the connection of the conduct with that state.

Jurisdiction must be exercised some*where*, with respect to some*thing or person*. As discussed above, jurisdiction cannot be applied to the high seas or to outer space[39] because these areas are considered *res communis* under international law and therefore are not 'places' that can be appropriated by claim of sovereignty. However, the 1967 Outer Space Treaty declares that a nation may exercise jurisdiction and control over objects in space, much as a nation may exercise jurisdiction over a ship at sea. Objects in space and ships at sea are treated (with some important limitations) as if they were part of the territory of the country on whose registry they are entered and whose flag they fly.[40]

B. Extent of National Jurisdiction

International law recognizes a nation's jurisdiction over its citizens, its territory, territorial waters and airspace, and those ships and aircraft which it has registered. Whether nations have, through the exercise of their domestic laws, actually extended their jurisdictions to the full extent allowed by international law is a more complicated question.

With reference to U.S. jurisdiction over space activities, it will be important to distinguish between what the United States is capable of doing and what, through congressionally enacted legislation, it has already done. Absent a specific statement of congressional intent, U.S. courts have been reluctant to give extraterritorial reach to certain domestic laws. For

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> 5. *The Passive Personality Principle* - A state may exercise jurisdiction with respect to any act committed outside its territory by a foreigner which substantially affects the person or property of a citizen."
> (S. Houston Lay, Howard J. Taubenfeld, *The Law Relating to Activities of Man in Space*, The University of Chicago Press, 1970).

"These principles of jurisdiction are not all accepted as equally valid. The nationality and territorial principles ... are universally accepted. The protective principle is now almost universally accepted. Universality is generally accepted only for recognized international crimes. The passive personality principle remains controversial as a basis of jurisdiction." (Major General Thomas Bruton, "The Status of Criminal Jurisdiction in Outer Space," 24th Conference of the Interamerican Bar Association (Panama City, Panama, February 1984).

[39] Except insofar as a nation may exercise jurisdiction and control over a ship ***on*** the high seas or a space object ***in*** outer space.

[40] The legal fiction that ships on the high sea and space objects in orbit are like "floating islands" has not been universally accepted. The U.S. Supreme Court, in *Cunard S.S. v. Mellon* (262 U.S. 100), referred to the floating island theory as "a figure of speech, a metaphor."

example, in *McCulloch v. Sociedad Nacional de Marineros de Honduras*,[41] the Court was asked to decide whether U.S. labor laws would apply to ships registered in Honduras and owned and operated by the Honduran subsidiary of a U.S. corporation. The Court noted that Congress had the "constitutional power to apply the National Labor Relations Act to the crews working foreign-flag ships, at least while they are in American waters," but decided that the resolution of the case depended on "whether Congress exercised that power." The court held: "to sanction the exercise of local sovereignty in this 'delicate field of international relations there must be present the affirmative intention of the Congress clearly expressed' ... Since neither we nor the parties are able to find any such clear expression, we hold the [National Labor Relations] Board was without jurisdiction ..."

Similarly, in *United States v. Cordova*,[42] the Court was asked to decide whether an assault committed in a U.S. flag airplane flying over the high seas was within the admiralty and maritime jurisdiction as described in the then current U.S. Criminal Code (18 U.S.C.A. Sec. 451).[43] Although the Court noted that "Congress could, under its police power, have extended federal criminal jurisdiction to acts committed on board an airplane owned by an American national...," the applicable legislation (18 U.S.C.A. Sec. 451) spoke only of "vessels" on the "high seas." The Court then concluded that "'vessel' ... evokes in the common mind a picture of a ship, not of a plane," and that no case or legal principle would "justify the extension of the words 'high seas' to the air space over them." [44]

The U.S. statute defining the "special maritime and territorial jurisdiction of the United States" for criminal jurisdiction has since been modified to resolve the problem presented in *United States v. Cordova* and to try to anticipate those problems which might arise in future space activities.[45] Currently, this special jurisdiction includes:

1. ... any vessel belonging in whole or in part to the United

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[41] 372 U.S. 10; 83 S. Ct. 671.

[42] 89 F.Supp. 298.

[43] At the time, 18 U.S.C.A. Sec. 451 stated that the admiralty and maritime jurisdiction of the United States extended to "American vessels on [the] high seas."

[44] *Cordova* involved the interpretation of a criminal statute; therefore, under U.S. law, the statute was strictly construed. Not all statutes are strictly construed. For example, the Death on the High Seas Act (46 U.S.C. 761), which provides a remedy for wrongful death occurring "on" the high seas, has been interpreted by several Federal courts to apply to tortious conduct "over" as well as "on" the high seas. See: *D'Aleman v. Pan American Airways*, 259 F.2d 493.

[45] 18 U.S.C.A. Sec. 7.

> States, or any citizen thereof, or to any corporation created by or under the laws of the United States ...
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> * * *
>
> 5. Any aircraft belonging in whole or in part to the United States, or any citizen thereof, or to any corporation created by or under the laws of the United States, ... while such aircraft is in flight over the high seas, or over any other waters within the admiralty and maritime jurisdiction of the United States ...
>
> 6. *Any vehicle used or designed for flight or navigation in space and on the registry of the United States pursuant to the [1967 Outer Space Treaty] ... and the [Registration Convention] ... while that vehicle is in flight ...* [emphasis added]
>
> 7) Any place outside the jurisdiction of any nation with respect to an offense by or against a national of the United States.

Given the restrictive interpretation of the U.S. jurisdiction presented in the *McColluch* and *Cordova* cases, it is possible to imagine further problems even under the revised Criminal Code. For example, is a large, manned space station designed to travel in a stable, set orbit considered to be a vehicle "used or designed for flight or navigation in space?" If so, then paragraph 6 of the Criminal Code (above) would include a space station within the "special maritime and territorial jurisdiction" of the United States. However, since space stations will have attributes which differ from those of space transportation vehicles--e.g., their size, complexity, multinational nature, duration in orbit, etc.--they might be considered to fall outside the general provisions of paragraph 6 which seem more applicable to shuttle-type vehicles.[46] If space stations did not meet the requirements of paragraph 6, they still might be included under the general provisions of paragraph 7. However, paragraph 7 raises a number of issues concerning the extraterritorial application of U.S. jurisdiction that are beyond the scope of this report.

In the future, it is entirely possible that some space stations will be privately owned. It is also possible that space stations owned in whole or in part by U.S. nationals or corporations will be registered in other countries. A state is generally considered to have jurisdiction to prescribe (though not necessarily enforce) rules of law regarding the conduct of its nationals wherever that conduct occurs.[47] The extension of U.S. law to privately owned space stations that were registered in other countries would be complicated by the fact that the law of the state of registry might conflict with that of the United States. This could cause problems since the United States, under article VI of the Outer Space Treaty, would remain responsible for the acts of its nationals in space.

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[46] The 'nature' of space stations is discussed in: Hamilton DeSaussure, "The Impact of Manned Space Stations on the Law of Outer Space," *supra*, note 10.

[47] Restatement (Second) of Foreign Relations Law of the United States, Sec. 30, American Law institute, 1965.

Finally, should the United States have the right to exercise its jurisdiction in a particular instance, it would still be necessary to decide how to share power between the Federal government and the individual States. This generally means deciding: 1) whether the grant of jurisdiction in a particular case is exclusively limited to Federal courts or is shared with the state courts, and 2) whether the individual States would be allowed to pass laws in this area.[48] The Judiciary Act of 1789 granted Federal courts exclusive jurisdiction over *in rem* (action against the vessel) admiralty questions. However, *in personam* (action against the owner of the vessel) maritime cases can be brought in State courts.[49] Similar grants or restrictions of the jurisdiction of Federal and State courts may be necessary for cases involving space activities. In addition, Congress may choose to limit the ability of States to pass laws in certain areas while allowing State courts to apply Federal law. For example, the Federal Aviation Act[50] limits the right of States to legislate with respect to commercial air travel; however, State courts share with Federal courts the ability to interpret the Federal Aviation Act. The "Commercial Space Launch Act,"[51] establishes a Federal licensing mechanism but notes that the "authority of States to regulate space launch activities within their jurisdictions, or that affect their jurisdictions, is unaffected by this Act..."

To summarize, the issue of jurisdiction is fundamental to the application of U.S. laws to space activities. The fact that international law would allow an extension of U.S. jurisdiction in a particular instance does not mean that such an extension has occurred. Laws meant to regulate U.S. domestic activities may not apply to U.S. space activities (just as the U.S. criminal laws did not apply to the *Cordova* case) unless Congress has clearly established its intention to so extend these laws. Should international law allow an extension of U.S. jurisdiction and should Congress establish its intention to take advantage of such an extension, it would still be necessary to decide whether Federal laws would preempt State laws with respect to space

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[48] Some laws may have to be exclusive (e.g., registration laws and laws pertaining to the spaceworthiness of spacecraft); other laws might be amenable to concurrent State/Federal jurisdiction (e.g., criminal and tort law pertaining to individuals on board).

[49] Maritime causes of action brought *in personam* in State courts must rely on maritime law and not the common law of the State of the forum. (See: *Garret v. Moore McCormack*, 317 U.S. 239 (1942).) Justice Black, writing in *United Fruit* (365 U.S. 731) noted that "Article VI of the Constitution carries with it the implication that wherever a maritime interest is involved, no matter how slight or marginal, it must displace a local interest, no matter how pressing and significant." The supremacy and uniformity doctrines that prevail in maritime law could be applied to law in outer space.

[50] 49 U.S.C. 130, *et seq.*

[51] 49 U.S.C. 2601-2623.

activities, and whether jurisdiction was shared by both Federal and State courts.

C. Jurisdictional Alternatives for Governments

A space station could have at least four different types of legal status, making it either:

1. **a national space station** under the jurisdiction and control of a single nation;[52]
2. **a multinational space station** under the joint jurisdiction and control of several nations;
3. **a multinational space station** the individual modules of which are under the independent jurisdiction and control of separate nations; or
4. **an international space station** under the jurisdiction and control of an international governmental organization similar to INTELSAT.

Under each of these options, the rights and liabilities of the U.S. Government and its citizens could be substantially different:

1) **U.S. Jurisdiction and Control.** To avoid the controversy and complexity of cooperative international ownership and operation, the United States may wish to retain complete control over the space station. Assuming the space station is owned and registered solely by the United States under the terms of the 1976 Registration Convention, its legal status would be similar to that of a ship or airplane flying the U.S. flag. As discussed above, ships[53] and aircraft[54] have the nationality of the state in which they are registered. The United States would have the sole power to make and enforce rules of law regarding the operation of such a space station as long as such rules did not violate international law. Presumably, the United States would coordinate many of these rules with the foreign participants in the space station.

As discussed above, Congress could apply U.S. laws to the activities aboard a U.S. space station, but in the absence of clear congressional intent such laws might not be independently applied by the courts.

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[52] Space stations owned by private sector entities and registered under the laws of a single state would also fall in this category. A space station that was owned by a U.S. national but registered in another country would fall in this category but would raise a more complicated set of legal issues. Some of these issues are discussed below.

[53] *Restatement (Second) of Foreign Relations Law of the United States*, Sec. 28(1), American Law Institute, 1965.

[54] *1944 Convention on International Civil Aviation*, 61 Stat. 1180; T.I.A.S. 1591.

2) **Joint Jurisdiction and Control.** Nations considering investing a substantial portion of their financial, technical, and human resources in the space station may wish to jointly own and register it through some type of international joint venture. Under current international law, joint *registration* (as distinguished from ownership) of space objects is not provided for. Article VIII of the 1967 Outer Space Treaty establishes the principle that "A State ... on whose registry an object launched into space is carried shall retain jurisdiction and control over such object."[55] The 1976 Registration Convention maintains that where two or more states may be considered "launching states,"[56] "they shall jointly determine which one of them shall register the object ... bearing in mind the provisions of article VIII."[57] Under the Registration Convention then, participants in a joint space endeavor must choose which one shall be the registering state. Nonetheless, the Registration Convention also states that such a joint determination is to be without prejudice "to appropriate agreements concluded ... among the launching States on jurisdiction and control over the space object and over any personnel thereof."[58]

Therefore, nations wishing to jointly own and jointly exercise jurisdiction and control over a space station can follow the Registration Convention's suggestion to engage in an agreement separate from the actual registration.

It is not clear now--and may not be clear until a body of case authority is available--just how "appropriate agreements" would modify the "jurisdiction and control" granted by article VIII of the Outer Space Treaty. The Registration Convention is patterned after maritime law. The 1958 *Convention on the High Seas* states that a ship may only sail under one flag and, save in exceptional circumstances provided for by treaty, the flag state has exclusive jurisdiction on the high seas.[59] Both maritime law and space law hold that registration implies jurisdiction. Similarly, both bodies of law allow this presumption of jurisdiction to be rebutted by specific agreements between the concerned parties. Although this practice has not been extensively used in maritime law it could be used for the space station.

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[55] 1967 Outer Space Treaty, *supra*, note 6, article VIII.

[56] Defined in article I of the Registration Convention as:
(i) A State which launches or procures the launching of a space object;
(ii) A State from whose territory or facility a space object is launched.

[57] The Registration Convention, *supra*, note 9, article II.

[58] Ibid.

[59] 2 U.S.T. 2312; T.I.A.S. 5200. Article VI of the 1958 Convention states:
1. Ships shall sail under the flag of one State only and, save in exceptional cases expressly provided for in international treaties, or in these articles, shall be subject to its exclusive jurisdiction on the high seas...
2. A ship which sails under the flag of two or more States, using them according to convenience, may not claim any of the nationalities in

3) **Jurisdiction and Control Over Independent Modules.** It is possible that nations may wish to join together to form a space station, yet retain control over their individual contributions. A space station could conceivably be composed of different modules, each owned, registered, and under the jurisdiction and control of separate countries. Common elements of the station such as power modules might be owned separately and shared through specific agreement (option one, above) or jointly owned (option two, above).

In such an environment, each module would be under the jurisdiction and control of the country that owned, operated, and registered it. The problems with registering the common elements of such a station would be similar to those encountered in option two.

4) **Jurisdiction and Control by an International Organization.** Assuming nations would wish to avoid some of the problems caused by concurrent national jurisdictions, it is possible that an international organization similar to INTELSAT could be formed to own, operate, and register the space station. Since such an organization would not be able to develop a completely independent body of law to regulate space activities, it would still be necessary to decide which national laws or combinations of national laws would apply to the organization.

Such an organization could have quasi-legislative powers (subject, of course, to the concurrence of the member states) similar to those held by INTELSAT. Such powers would allow the organization to make normal operational, management, and safety decisions without the need to renegotiate separate agreements among the member states.

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question with respect to any other State, and may be assimilated to a ship without nationality.

Article 92 of the 1982 United Nations Convention on the Law of the Sea contains language almost identical to the language of the 1958 Convention. The United States is not a party to the 1982 Convention.

IV - INTELLECTUAL PROPERTY IN SPACE

A. Patent Law Issues

Congress is currently considering two patent law issues that could have an important impact on space station activities: 1) how to protect the intellectual property rights of private sector firms and individuals working with the government in space; and 2) how to ensure that U.S. patent law protections apply to space activities.

1) Intellectual Property Rights in Government/Private Sector Space Activities

Section 305 of the 1958 National Aeronautics and Space Act (NAS Act) states that "whenever any invention is made in the performance of any work under any contract of [NASA], such invention becomes the exclusive property of the United States unless [NASA] waives rights thereto..."[60] Over the last two and-a-half decades NASA has interpreted section 305 to apply only to activities which have as their main purpose the development of some new product or process for NASA. With respect to NASA/private sector joint ventures, it has been NASA's position that neither party assumes any obligation to perform inventive work for the other, and accordingly, each party retains the rights to any invention that may be made in the course of the venture.[61]

One of the most significant ways in which the U.S. Government has sought to encourage private sector materials processing activities in space has been NASA's Joint Endeavor Agreements (JEAs). The intellectual property rights of the private participant of a JEA have, to date, been protected by the contract provisions of the individual JEAs. For example, in the first JEA, NASA and the McDonnell Douglas Corp. (MDAC) agreed that NASA would not acquire rights in inventions made by MDAC or its associates in the course of the joint endeavor unless MDAC failed to exploit the inventions or terminated the agreement, or unless the NASA Administrator determined that a national emergency existed involving a serious threat to public health.

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[60] 42 U.S.C. 2451, *et seq.*

[61] "Space Industrialization Act of 1979," statement of Robert A. Frosch; Hearings on H.R. 2337 before the Subcommittee on Space Science and Applications of the House Committee on Science and Technology (96th Cong., 1st sess., 1979).

Although individually negotiated contracts may solve the problems associated with NASA's JEA program, some Members of Congress felt that U.S. laws could be used to encourage commercial space activities. In 1985, Congressman Manuel Lujan introduced a bill[62] that would use the patent system to promote space commercialization by guaranteeing that inventions made in space with Federal assistance or under Federal contract would be the exclusive property of the inventor. The bill would allow Federal agencies to reserve a nonexclusive, nontransferable, royalty-free license to use the invention on behalf of the United States.[63]

As a proposal for domestic law designed to promote space commercialization, H.R. 3112 is somewhat beyond the scope of this paper. It is important to note, however, that there has been a great deal of recent interest in government patent policy that may well affect space station operations. One recently enacted law (Public Law 96-517) provides uniform Federal patent procedures for small businesses and nonprofit organizations, including universities. These entities, among other things, may elect to retain title to inventions resulting from Federally funded research and development. On February 18, 1983, President Reagan signed a memorandum that directed executive agencies to revise Federal policy for all R&D contractors to be consistent with Public Law 96-517. NASA and the Department of Energy, which operate under statutes that are inconsistent with the memorandum, are expected to make maximum use of the flexibility available to them to comply with the spirit of the memorandum.

In the 99th Congress, S. 64 was introduced by Senator Robert Dole--a principal sponsor of Public Law 96-517--to extend Public Law 96-517 to all Federal contractors and to create uniform policy and procedures concerning patent rights in inventions developed with Federal assistance. Should S. 64 be successful, it might resolve some of the concerns expressed in the Lujan bill.

2) U.S. Patent Law and Space Activities

This section discusses how new legislation designed to extend U.S. patent law to space has caused a reexamination of some old and fundamental patent law issues. Resolving some of these issues--such as limitations on the extraterritorial application of U.S. patent law, the status of inventions reduced to practice in foreign countries, and the status of foreign patents and patent applications--may require changes in existing laws. This section also examines how these issues are influenced by the different ways space stations could be owned and operated.

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[62] H.R. 3112 (99th Congress).

[63] Section 222 of H.R. 3112 states:

> "(a) In any case where an invention is made by a person in the course of activities of any kind in outer space, whether made with assistance from one or more Federal agencies or in the course of work performed under contract with one or more Federal agencies or otherwise, such invention shall be the exclusive property of that person..."

Before examining the specific details of these issues, it is useful to review a few basic principles of U.S. patent law.[64]

In the United States, a patent may be obtained for a useful product or process only if it meets the standards of "novelty" and "nonobviousness" when compared with the "prior art."[65] When two or more persons independently claim a U.S. patent on the same subject matter, U.S. law awards the patent to the first person to invent. Most other countries maintain that the first person to apply for the patent--not the first person to invent--is entitled to receive the patent. Priority of invention under U.S. law is determined by reference to certain key events such as when the invention was conceived and when it was first reduced to practice. U.S. patent law does not allow these events to be established by reference to activities in foreign countries. Obviously then, how one characterizes space objects and how jurisdiction is defined in space are critical patent law questions. An invention reduced to practice on a foreign space station module--that might be regarded as a foreign country--would be insufficient under U.S. law.

In an attempt to ensure that U.S. patent protection was available for inventions in space, Representative Robert W. Kastenmeier introduced H.R. 2725 in the 99th Congress.[66] This bill would amend the current U.S. patent law and the NAS Act to state: "any invention made or used in outer space on an aeronautical and space vehicle [as defined in the NAS Act[67]] under the jurisdiction or control of the United States shall be considered made or used within the United States for the purposes of this title."

The Kastenmeier bill is designed to prevent the type of problem that arose in the *Cordova* case.[68] Given the uncomplicated form and intentions of H.R. 2724, the drafters and other concerned individuals anticipated that the bill would engender little opposition or controversy. Asked to comment on the effect of H.R. 2725 on current patent law, Gerald Mossinghoff, President of the Pharmaceutical Manufacturers Association and former Commissioner of Patents, stated: "the proposed amendment does not alter current patent law but rather clarifies what would be a logical interpretation or extrapolation of the current law."[69] With respect to the question of whether current patent law already covers space activities, Mr. Mossinghoff responded: "one could logically reach a conclusion that activities aboard a U.S. spacecraft are tantamount to activities in the United States."[70]

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[64] *See generally:* Barbara Luxenberg, "Protecting Intellectual Property in Space: Policy Options and Implications for the United States," Georgia Institute of Technology Conference; Atlanta, GA, May 16, 1985; Donald S. Chisum, "Statement on H.R. 2725," Hearing Before the Subcommittee on Courts, Civil Liberties, and the Administration of Justice, House Committee on the Judiciary, June 13, 1985.

[65] 35 U.S.C. 102, 103.

[66] The current bill number is H.R. 4316.

[67] Section 103 (2) of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2451), states:

> ...the term "aeronautical and space vehicles" means aircraft, missiles, satellites, and other space vehicles, manned and unmanned, together with related equipment, devices, components, and parts.

Responding to the same questions, Herbert C. Wamsley, Executive Director of Intellectual Property Owners, Inc., stated: "It is our impression that many or most people believe U.S. patent law already extends to "outer space...under the jurisdiction and control of the United States..."[71]

The U.S. Department of Justice took a different position from that of either Mr. Mossinghoff or Mr. Wamsley. In a letter to Neil Hosenball, NASA's then General Counsel, Robert A. McConnell, Assistant General Counsel of the Justice Department, argued that it was not at all clear whether activities on a U.S. spacecraft could be viewed as activities in the territorial United States, and therefore, U.S. patent laws might not apply to such spacecraft. McConnell noted that the legislation would "effect a substantial amendment to [the U.S. Patent Code] Title 35."[72] Mr. McConnell stated the Justice Department's position that: "The patent laws do not currently have any effect outside the territorial limits of the United States," and that "the United States is not liable for patent infringement arising in a foreign country."[73] Although admitting that older cases (involving ships on the high seas and U.S.

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[68] As mentioned above (note 44) such comparisons can be difficult since criminal statutes are strictly construed.

[69] Letter to The Honorable Robert W. Kastenmeier, Chairman, Subcommittee on Courts, Civil Liberties and the Administration of Justice, House Committee on the Judiciary, from Gerald J. Mossinghoff, President, Pharmaceutical Manufacturers Association, May 8, 1985.

[70] Ibid.

[71] Letter to The Honorable Robert W, Kastenmeier, Chairman, Subcommittee on Courts, Civil Liberties and the Administration of Justice, House Committee on the Judiciary, from Herbert C. Wamsley, Executive Director of Intellectual Property Owners, Inc., June 11, 1985.

[72] Letter to the Honorable S. Neil Hosenball, General Counsel, NASA, from Robert A. McConnell, Assistant Attorney General, U.S. Department of Justice, Oct. 11, 1984.

[73] Ibid.

emabassies in foreign lands) could be found on both sides of the extraterritoriality issue, the Justice Department took the position that recent court decisions express a clear intention to restrict the application of the Patent Code to U.S. territory.

Mr. McConnell warned that in addition to amending the Patent Code, the new legislation would also "expand the Government's liability" because "both the Navy and the Air Force have space programs which may be affected if NASA's proposal is adopted." More specifically, Mr. McConnell pointed out that the United States is currently being sued by the Hughes Aircraft Co. for infringing on one of its satellite patents.[74] In this case, the United States plans "to argue with respect to about a dozen satellites that the patented invention was never used *in the United States*" (emphasis added). If the U.S. Government did not use the patent in the territorial United States, and if the Justice Department interpretation of the Patent Code is correct, then the U.S. Government could not be held liable on the infringement charge.

"If the Administration decides to support this proposal," Mr. McConnell urged that it "be limited to that prospective application only." The current legislation, H.R. 2725, responds to the Justice Department's concern and limits the effect of the legislation.[75]

Asked by the House Judiciary Committee to respond to the Justice Department's comments, the American Law Division of the Congressional Research Service (CRS) took a slightly different position: "our review of the 'state of the law' reveals that such an assertion...[that U.S. patent law would not protect an invention made or used in outer space because those laws do not have any effect outside the territorial limits of the United States]...is not as clearly defined or applicable as...[the Justice Department's]...comment would lead one to believe."[76] The CRS memorandum goes on to say that, with respect to the principal case cited by the Justice Department: "It would appear that all the Court was saying was that it is not at all clear whether

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[74] *Hughes Aircraft Company* v. United States (Ct. Cl. No. 426-73).

[75] Mr. McConnell was responding to an early draft of the legislation. The Kastenmeier bill was amended to read:

(b) AMENDMENTS NOT TO AFFECT PRIOR DECISIONS. - The amendments made by section 1 shall not affect any final decision made by a court or the Patent and Trademark Office before the date of the enactment of this Act with respect to a patent or an application for a patent, if no appeal from such a decision is pending and the time for filing an appeal has expired.

(c) AMENDMENTS NOT TO AFFECT CERTAIN PENDING CASES. - The amendments made by section 1 shall not affect the right of any party in any case pending in a court on the date of the enactment of this Act to have the party's rights determined on the basis of the substantive law in effect before such date of enactment.

[76] Letter to David Beier, House Judiciary Committee, from Daniel Hill Zafren, American Law Division, Congressional Research Service, Apr. 9, 1985.

Congress intended the patent laws to apply to a United States flag vessel or plane, [and] that the patent bar might want to invite Congress to consider such a possible 'loophole'..."

The CRS memorandum concluded: "If a case can be made that the patent laws could apply to an invention made or used on a United States' flag vessel on the high seas...the contention would seem to be even more convincing regarding a United States' space vehicle in outer space." This view was bolstered, in CRS's view, by the U.S. participation in the 1976 Registration Convention which was "designed to facilitate the exercise of jurisdiction and control by a launching state over its space objects."

In light of the case authority and the opinions of the majority of legal scholars, the Department of Justice's position on H.R. 2725 may not be supportable.

Even disregarding the objections of the Department of Justice, there are several important lessons to be learned from the debate over H.R. 2725. The first is to recognize that when applying a body of terrestrial law *in toto* to space activities, all the ambiguities and contradictions currently existing in that body of law are also transferred. With respect to the extraterritorial application of U.S. patent law, unresolved questions concerning the nature of U.S. jurisdiction over its flag ships and the status of ships as "U.S. territory" must now be faced with respect to space objects. Although the intent of H.R. 2725 is clear--to apply U.S. patent protections to inventions made or used in outer space on space vehicles under the jurisdiction and control of the United States--the fact that this issue has never been clearly resolved with respect to maritime law causes unforeseen problems.

A second important lesson is to strive for functional consistency in new legislation relating to space activities. As written, H.R. 2725 applies to "space vehicle[s] under the jurisdiction or control of the United States." This differs slightly from the scope of the "special maritime and territorial jurisdiction"[77] which applies U.S. criminal law to "Any vehicle used or designed for flight or navigation in space and on the registry of the United States pursuant to the [1967 Outer Space Treaty]...and the [1976 Registration Convention]..."[78] H.R. 2725's "jurisdiction or control" also differs slightly from the Outer Space Treaty's article VIII which speaks of nations retaining "jurisdiction and control" over their space objects.

It is not clear that the space objects described here--those under the "jurisdiction and control" of the United States (1967 Outer Space Treaty), those under the "jurisdiction or control of the United States (H.R. 2725), and those registered under the 1976 Registration Convention--are identical sets. This is particularly true when one considers that article II of the

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[77] Discussed *supra*, p. 27.

[78] 18 U.S.C.A. Sec. 7.

Registration Convention allows countries to enter into separate agreements regarding jurisdiction and control, thereby creating a situation where someone could have jurisdiction and control over a space object without having registered it. Minor discrepancies in this and other space legislation could result in unforeseen problems.

In addition to general jurisdictional questions, a number of specific patent law issues must be addressed. For example, under current U.S. law,[79] when there are conflicting claims to an invention, the person who invented first has the valid claim. An applicant may not establish the date of invention by reference to activity in a foreign country. H.R. 2725, if passed into law, would allow an applicant to use activity aboard a U.S. spacecraft--considered under the terms of the legislation to be "in the United States"--in an interference proceeding to prove priority of invention. Activities on foreign spacecraft would, presumably, be regarded as activities in a foreign country. This might be the case even where the "foreign spacecraft" was attached to an otherwise completely U.S. space station.

This report examined the four different ways in which a space station could be owned, registered, and operated. With the exception of the U.S. registry and, perhaps, those U.S. modules of a separate registry, H.R. 2725 might not apply to other jurisdictional regimes.

Another problem arises from the uncertain effect of H.R. 2725 on the Inventions Secrecy Act.[80] The Inventions Secrecy Act states that, with respect to inventions made in the United States, a person may not file an application for a patent in a foreign country unless that person has already: 1) filed in the United States and waited 6 months; or 2) obtained a license to file abroad from the Commissioner of Patents and Trademarks. Any patent obtained in violation of the Inventions Secrecy Act is considered by the United States to be invalid, although the Commissioner may grant a retroactive license upon a showing of "inadvertence."

The Inventions Secrecy Act presents some difficult problems for foreign nationals working on a U.S. or jointly owned space station. For example, a French astronaut who reduces an idea to practice on a U.S. space station would be forced to file for a U.S. patent or an exemption from the Act, or risk having the patent being declared invalid in the United States.[81] To the extent that such problems could limit the success of the space station, every effort must be made to achieve some type of international coordination.

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[79] 35 U.S.C. 104.

[80] 35 U.S.C. 181-188.

[81] Letter to The Honorable Robert W, Kastenmeier, Chairman, Subcommittee on Courts, Civil Liberties and the Administration of Justice, House Committee on the Judiciary, from Donald S. Chisum, Professor of Law, University of Washington, June 18, 1985.

V - CRIMINAL LAW IN SPACE

Any investigation into the application of criminal law to activities in space must address two interrelated questions: "What body of criminal law is to be applied?"; and "How are the relevant laws to be enforced?"

A. Jurisdiction and Control

The simple answer to the first question is: "Whatever nation has jurisdiction and control over the space object." As discussed in detail above, questions of jurisdiction are not easily resolved without first knowing how the space station is to be owned and registered. If some type of shared jurisdiction and control scheme is used, and if more than one nationality is represented in the crew, it is possible that there would be more than one body of criminal law that could be applied. In that case, the nations involved might wish to agree in advance to adopt one nation's laws, a special criminal code composed of the laws of several nations, or a special set of "conflict of law" rules for applying different national laws in different situations.

It is also important to remember that jurisdiction can be based on more than ownership and registration. In principle, all a nation need do is establish a genuine link between itself and the persons, property, or events over which jurisdiction is claimed. As a result, should a French astronaut assault a German astronaut on a U.S. space station, both the French and German courts, relying on the nationality principle, and the U.S. courts, relying on the territorial principle, might claim that they had the right to exercise criminal jurisdiction over the French astronaut who committed the crime.

In light of these difficulties, it might be desirable to simply negotiate an agreement in advance of occupying the space station. Negotiated agreements have been used effectively to govern the activities of diplomats and soldiers stationed in foreign lands. Since article II of the Registration Convention allows nations to enter into separate agreements with respect to jurisdiction and control over space objects and personnel, this might be an effective way to manage criminal actions in space, at least with respect to the first space stations. In the past, three basic options have been used:

- **Complete Immunity From Prosecution** - Assuming that one nation's laws are chosen to govern the space station, other nations might wish to protect their space station astronauts with immunities similar to those enjoyed by diplomats. Under such a scenario, the individual governments would be responsible[82] for the good conduct of their citizens but individual citizens could not be charged for civil or criminal offenses committed while on the space station. Astronauts on board the spacecraft of another nation would, then, have the status of diplomats in a foreign land.

- **Limited Immunity** - If complete immunity were judged undesirable, nations might wish to negotiate more limited agreements. For example, individuals might be liable for actions not accomplished as part of their "official duty." Alternatively, individuals might be liable for civil wrongs but immune to criminal prosecution.

- **Negotiated General Agreement** - The nations of the North Atlantic Treaty Organization (NATO) have developed a complex set of agreements (Status of Forces Agreements) to govern questions of jurisdiction and control with respect to NATO troops stationed in the respective countries. These agreements grant the host countries exclusive jurisdiction over some offenses and grant concurrent jurisdiction over others. Where concurrent jurisdiction exists, one nation may be given primary jurisdiction which may be waived, at its discretion, in favor of some other nation. Such negotiated agreements would be useful whether jurisdiction and control of the space station were held by one nation, several nations, or whether nations retained control over individual modules.

B. Ability to Enforce Criminal Laws

It is important to remember that a state having the jurisdiction to prescribe a rule of law may not, in all cases, have jurisdiction to enforce that rule. In the *Case of the S. S. Lotus*,[83] a French merchant vessel struck a Turkish vessel on the high seas killing a number of Turkish nationals. When the French vessel landed in a Turkish port, a French officer was tried and convicted for manslaughter under a Turkish law attaching criminal penalties to collision on the high seas.[84] The Permanent Court of International Justice held that the Turkish vessel was like Turkish soil; therefore, Turkey had the jurisdiction to ***prescribe*** the criminal laws which had been applied to the French officer. Because the French officer later landed on Turkish soil, Turkey had the jurisdiction to ***enforce*** the laws in question. Had the French ship not landed in a Turkish port, this would not have affected the right of the Turkish Government to prescribe the rule in question but it would have

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[82] Such "responsibility" might or might not include financial "liability" for actions committed aboard a space station.

[83] P.C.I.J., ser. A, No. 10 (1927); [1927-1928] Ann. Dig. 153 (No. 98).

[84] While the offense of manslaughter occured on the high seas, the Turkish law was much broader, encompassing any offense 'abroad' against Turkey or a Turkish national. The Turkish law reflected an acceptance of the passive personality principle (discussed above, note 38). This principle is not recognized by the United States except in extraordinary cases such as terrorism.

altered its ability to enforce that rule.

Although the decision in the *Lotus* case is no longer a valid precedent in maritime law,[85] it does serve to highlight several important space station issues. For example, suppose the United States and Great Britain jointly own a space station but maintain jurisdiction and control over their separate space modules. Now, further suppose that a British astronaut assaults a U.S. astronaut while the U.S. astronaut is in the British module. There is no doubt that the United States would have the jurisdiction to pass laws prohibiting such conduct; whether the United States would have the jurisdiction to enforce such rules would depend on whether it had some prior agreement with the British Government. Lacking an agreement with the British Government, the United States would not have jurisdiction to enforce these laws in the parts of the space station under British jurisdiction and control.

C. U.S. Criminal Law in Space

Initially, NASA regulations were the primary means by which U.S. law was extended into space. The authority to develop these regulations was granted to the Administrator in the 1958 NAS Act.[86] As currently written, these regulations grant the shuttle commander broad authority over U.S. and foreign crew members to enforce order and discipline during space shuttle flights.[87] In 1976, NASA's administrative regulations were strengthened by

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[85] Article XI of the "Convention on the High Seas," Apr. 29, 1958 (13 U.S.T. 2312; T.I.A.S. 5200) states:

> 1. In the event of a collision or of any other incident of navigation concerning a ship on the high seas, involving the penal or disciplinary responsibility of the master or of any other person in the service of the ship, no penal or disciplinary proceedings may be instituted against such person except before the judicial or administrative authorities either of the flag state or of the state of which such person is a national.

See also: 1982 United Nations Convention on the Law of the Sea, article 97.

[86] Section 203 (c) states: "... the Administrator is authorized...to make, promulgate, issue, rescind, and amend rules and regulations governing the manner of [NASA's] operations and the exercise of the powers vested in it by law"; (42 U.S.C. 2473).

[87] 14 C.F.R. 1214.702 (1972) states:

> 2. (a) During all phases of an STS flight, the STS commander shall have the absolute authority to take whatever action is in his/her discretion necessary to (1) enforce order and discipline, (2) provide for the safety and well being of all personnel on board, and (3) provide for the protection of the STS elements and...payload...The commander shall have authority throughout the flight to use any reasonable and necessary means including the use of physical force, to achieve this end.
>
> (b) The authority of the commander extends to any and all personnel on board the Orbiter including Federal officers and employees and all

the introduction of criminal sanctions, which stated:

> Whoever willfully shall violate, attempt to violate, or conspire to violate any regulation or order promulgated by the [NASA] Administrator...shall be fined not more than $5,000, or imprisoned not more than one year, or both.[88]

NASA regulations and their related criminal sanctions were sufficient to maintain order when the only people in space were highly trained and disciplined NASA astronauts carrying out closely supervised tasks. Congress, looking forward to a time when large numbers of men and women would work in space for long periods of time in a relatively unstructured environment, amended the United States code in 1981 to include U.S. space vehicles within the "special maritime and territorial jurisdiction"[89] of the United States. The inclusion of U.S. space vehicles within this special jurisdiction meant that, in addition to NASA regulations, a range of more common criminal offenses would be applicable to people living and working in space.[90] [91]

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other persons whether or not they are U.S. nationals.

For another look at the role of the space station commander, *see*: Scott F. March, "Authority of the Space Station Commander: The Need for Delegation," *Glendale Law Review*, vol. 6, No. 1, 1984.

[88] 18 U.S.C. 799.

[89] The "special maritime and territorial jurisdiction" is discussed above, p. 27.

[90] U.S. military personnel will also be subject to the jurisdiction of the Uniform Code of Military Justice (10 U.S.C. 805 (1976)) which applies "in all places."

[91] As a result of the 1981 amendment, the following activities, if conducted in space, would be regarded as Federal crimes: arson (18 U.S.C. 81), assault (18 U.S.C. 113), maiming (18 U.S.C. 114), embezzlement and theft (18 U.S.C. 661), receiving stolen property (18 U.S.C. 662), false pretenses (18 U.S.C. 1025), murder (18 U.S.C. 1111), manslaughter (18 U.S.C. 1112), attempted murder or manslaughter (18 U.S.C. 1113), malicious mischief (18 U.S.C. 1363), rape (18 U.S.C. 2031), and robbery (18 U.S.C. 2111).

VI - TORT LAW IN SPACE

A. Applicable Law

As people begin to live and work in space, incidents of damage caused by intentional actions or negligence are certain to occur. Individuals seeking compensation for damage to property or personal injury may look either to international space law or to the tort laws of their own or other nations. Unfortunately, none of these courses of action is without difficulty. Current international space laws are little more than agreed fundamental principles, and no efficient mechanisms exist for applying these principles to specific cases. National tort laws, on the other hand, are well developed but vary drastically from country to country. In the United States, certain elements of tort law are not even consistently applied among the different States. Furthermore, some States have recently enacted legislation that limits the recovery of certain types of damages in tort suits.

1) International Law

As discussed above, article VI of the Outer Space Treaty provides that states party to the treaty bear "international responsibility for national activities in outer space," and that the activities of "nongovernmental entities" (i.e., individuals, corporations, etc.) "shall require authorization and continuing supervision by the appropriate State Party to the Treaty." Article VII of the Outer Space Treaty declares that a launching state is "internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons..." The 1973 Liability Convention restates and expands on the principles established in article VII of the Outer Space Treaty and provides specific procedures for making and settling claims.

Although the Outer Space Treaty and the Liability Convention establish several key principles--e.g., absolute liability for damage on Earth or in the air, and liability of the launching state for either government or private sector activities--both treaties leave a great many questions unanswered. Three important problems raised by the current international space liability regime are:

- **Uncertain applicability to activities aboard space stations.** There is considerable doubt as to whether the Liability Convention could ever be applied to injury or damage caused by persons participating in space station activities. Article VII states that the Convention does not apply to either the "nationals of [the] launching state" or "foreign nationals...participating in the operation of that space object..." This paper previously examined four different ways to own, operate, and register a space station. No matter which of these was chosen, it is likely that the participants would either be "nationals of [the] launching state" or "foreign nations...participating in the operation of that space object..." Therefore, the Liability Convention would not apply. For example, under article VII of the Liability Convention, if a U.S. astronaut were killed by the negligence of either another U.S. astronaut or a foreign astronaut, the family of the U.S. astronaut could not file a claim for damages under the Liability Convention because the United States was the "launching state."

o **Lack of attention to damage caused by, and the liability of, individuals.**[92] Both the Outer Space Treaty and the Liability Convention focus on damage caused by space objects rather than on damage caused by individuals in space. This is understandable because the primary concern of the drafters was probably to offer some degree of protection from falling or colliding space objects. The crash of the radioactive Soviet satellite, Cosmos 954, in Canada was an example of the kind of injury best suited to the protections of the international treaties.

On a space station, however, individual personal injury actions resulting from intentional actions or negligence are likely to predominate. A good example of the Liability Convention's lack of attention to the role of individuals in space can be seen in its application of the doctrines of "strict" and "fault" liability.[93] According to the terms of the treaty, a launching state whose space objects cause damage on the surface of the Earth or to aircraft in flight is strictly liable for the damage caused. States whose space objects cause damage to other objects in space are liable only after fault has been established. However, no such division between strict liability and fault liability is made with respect to individual conduct.

It is generally held, at least in common law countries, that strict liability applies to certain abnormally dangerous conditions and activities.[94] Since, at present, most space activities might be regarded as "abnormally dangerous"[95] one might argue that "fault" should play a diminished role in space.[96] On the other hand, one could also argue that all persons on the space station are to some degree engaged in an "abnormally dangerous" activity and that this is quite different from the situation on Earth where the injured party might not be a participant in the activity in question.[97]

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[92] *See also:* Hamilton DeSaussure, P.P.C. Haanappel, "A Unified Multinational Approach to the Application of Tort and Contract Principles to Outer Space," *Syracuse Journal of International Law and Commerce*, vol. 6, No. 1, summer 1978.

[93] "Strict" and "fault" liability explained, *supra*, note 22.

[94] DeSaussure and Haanappel, *supra*, note 92.

- **No efficient mechanism for resolving disputes between individuals.** Serious questions exist as to whether current international laws could be applied to assist individuals. The 1967 Outer Space Treaty and the Liability Convention establish no cause of action, no courts, no rules of procedure, and no method of enforcing even agreed resolutions. Lacking such mechanisms, claimants are forced to rely on the diplomatic procedures commonly used between nations.

  Article VIII of the Liability Convention requires that the state--not the injured person--present the claim to the "launching state"--not the person[98] who caused the injury. Because nations and not individuals are involved, under article IX, claims for compensation must be presented "through diplomatic channels." If the two states in question do not have diplomatic relations then the claimant may present its claim through another state or through the Secretary-General of the United Nations. Assuming that a claim has been filed and diplomatic negotiations have failed for a year, then article XIV authorizes the parties to set up a "Claims Commission" composed of three members (the two parties and an agreed chairman).

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[95] It is useful to remember that when the aviation industry began, some courts regarded air travel as abnormally dangerous and imposed a strict liability standard; with experience and technical improvements, the negligence standard gradually gained prominence.

[96] It might be argued that eliminating the necessity to prove fault and thereby forcing all actors in space to cope with a strict liability scheme would be socially desirable for many of the same reasons that strict liability is used on Earth; that is, to make those engaged in dangerous activities liable for the consequences of such activities. However, such a requirement could diminish the pursuit of commercial space opportunities by placing a heavier liability burden on these activities.

[97] Maritime law offers some interesting insights into the question of liability for injury to individuals on board a space station. Under maritime law, the shipowner must furnish a vessel that is seaworthy in all respects. (*see. Mitchell v. Trawler Racer, Inc.*, 362 U.S. 539.) The shipowner's duty is nondelegable and the fact that the shipowner used 'due diligence' to make the vessel seaworthy is no defense if a member of the ship's crew is injured by some defect. What constitutes a defect has been broadly construed, and so has the question of who is a seaman for the purpose of bringing an unseaworthiness action.

The concept of 'seaworthiness'--or in this case, 'spaceworthiness'--may eventually be a useful addition to space law, as it could serve to protect space workers and transfer the risk of liability to the spacecraft owner, who presumably, is in a better position to assess the risks of a particular activity.

With respect to liability as *between* spacefareres, the concept of fault may be more useful. How fault would be determined and what defenses would be permitted (e.g., contributory negligence, fellow servant rule, assumption of risk) are some of the most challenging questions that are likely to accompany the development of a tort law for space.

2) National Tort Laws

Perhaps in anticipation of the problems mentioned above, the drafters of the Liability Convention stated in article XI that: "Nothing in this Convention shall prevent a State, or the natural or juridical persons it might represent, from pursuing a claim in the courts...of a launching state." Indeed, given the vague nature of the Liability Convention as compared with the well-defined state of domestic law, it would be unlikely that any individual would ever use it to obtain compensation for injury.[99]

Having acknowledged this, it is then necessary to inquire which domestic laws would be applicable to a given case. Whenever individual relationships transcend the boundaries of one jurisdiction, conflicts arise concerning the applicable substantive law, the jurisdiction of national courts, and enforcement of foreign judgments.[100] For example, every nation has its own methods for choosing the law applicable in a specific case. The most common of these are:

- **The *lex loci delecti***, that is, the law of the place where the offense occurred. Outer space, being *res communis* and, therefore, not subject to national law, has no clear 'law of the place.' Whether or not the *lex loci delecti* rule can be applied to the space station will depend on how nations agree to exercise jurisdiction and control over the space station.

- **The *lex fori***, that is, the law of the forum where the case is brought. This approach could be used on the space station, but again, would depend on how questions of jurisdiction and control are resolved.

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[98] The treaty does not actually speak of "persons" who cause damage, only "space objects" which cause damage.

[99] *See, for example:* Scott F. March, "Dispute Resolution in Space," *Hastings International and Comparative Law Review*. vol. 7, p. 211, 1983.

[100] *See generally:* P.P.C. Haanappel, "Possible Models for Specific Space Agreements," Hamburg Space Station Symposium, 1984.

- **The law of the state having the greatest interest.** This rule--probably the prevailing U.S. standard--looks to which state's contacts with the incident are the most substantial and applies the relevant laws of that state. Because of its flexibility, this rule could have the greatest applicability to space station activities.

An important alternative (at least in contract, if not in tort cases) would be for the parties to stipulate both the applicable national law, and the applicable forum. This practice is frequently followed in multinational business contracts. This approach has two major defects. First, such stipulations would constrain only those who signed them. As space stations become larger, employing greater numbers of people, it may be impossible to anticipate and draw up contracts to cover all the interpersonal relationships that could develop. Second, some courts look with disfavor on contracts that attempt to divest them of jurisdiction. For example, a French citizen has a statutory right to resort to the French judicial system even if the damage was caused on foreign soil or by a foreigner.[101] It is possible that a French court would choose to ignore a contract clause that attempted to divest its citizens of this right.

Given the current level of space activity, another solution to the problem of liability might be to negotiate interparty waivers of liability. The limitation of such agreements is that they only cover signatories. Interparty waivers of liability were used in the 1973 Spacelab Agreement,[102] the 1985 Memorandum of Understanding (MOU) regarding Phase B of the space station negotiations,[103] and are regularly used in shuttle launch agreements.

Article 11 (A) of the Spacelab Agreement, for example, provides that the United States "shall have full responsibility for damage to its nationals...[resulting from]...this agreement." The ESA nations accept a similar "responsibility" under this article. In other words, the United States would not sue ESA for damage to U.S. nationals or property and *vice*

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[101] Fr. C. CIV. art. 14, *reprinted in* H. De Vries, N. Galston, R Loening, *Materials for the French Legal System* 2, 2d ed., 1977. Article 14 provides:

> An alien, even one not residing in France, may be summoned before the French courts for the fulfillment of obligations contracted by him in France; he may be brought before the French courts for obligations contracted by him in a foreign country toward French persons.

Under French law "obligations" refers to tortious (delictual) as well as contractual obligations. *See also*: DeSaussure and Haanappel, *supra*, note 92.

[102] Space Laboratory: Cooperative Program, 24 U.S.T. 2049; TIAS 7722.

[103] *See*: "Memorandum of Understanding Between the National Aeronautics and Space Administration and the European Space Agency for the Conduct of Parallel Detailed Definition and Preliminary Design Studies (Phase B) Leading Toward Further Cooperation in The Development, Operation and Utilization of a Permanently Manned Space Station," June 3, 1985.

versa. However, article 11 (C) acknowledges that in the event injury is caused to persons not party to the agreement, "...such damage shall be the responsibility of...[the United States or ESA]...depending on where the responsibility falls under applicable law." The 1985 space station MOU between NASA and ESA extends the interparty waiver of liability to the Phase B contractors and subcontractors; however, third parties are still not covered under the agreement.

B. Future Developments

Current international space law will continue to be an effective means for allocating responsibility and liability for incidents which occur between nations. For example, should a space object of one nation fall on the territory of another nation or should one nation's space object collide with a space object of another nation, the principles found in the 1967 Outer Space Treaty, the Registration Convention, and the Liability Convention will, when combined with serious diplomatic efforts, be sufficient to resolve these problems. As space activities increase and technologies grow more complex, some refinement of these principles will probably be necessaryl; nonetheless, the existing framework is workable *when applied to national activities*.

Unfortunately, the legal regime for redressing individual grievances resulting from space activities is not nearly so well established. As discussed above, international space law, with its heavy reliance on diplomacy, is too unwieldy for most tort actions between individuals, and negotiated interparty waivers of liability do not address the problem of third-party plaintiffs.

National tort laws, although well defined, differ considerably and no consensus exists on when to apply the laws of one or another nation. The actions necessary to resolve this problem vary with time:

- **Short-term solutions (shuttle activities)**. Because the shuttle carries multiple and often multinational payloads, NASA has had to develop policies regarding both liability between mission participants (interparty liability) and liability with respect to parties unrelated to the mission (third-party liability).[104] With respect to interparty liability, the standard shuttle launch agreement contains a mutual covenant not to sue similar to the one found in the Spacelab Agreement.

To cover the possibility of third-party suits, NASA also requires shuttle payload owners to purchase insurance to protect against damage to property and injury to persons unrelated to the space activities. This third-party insurance would, for example, be used to compensate individuals on Earth for damage they sustained as a result of de-orbiting space debris.

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[104] *See:* Maj. Bruce A. Brown, "Commercial Law and Liability Issues of the Space Transport System," *The Air Force Law Review*, vol. 23, Nos. 3 & 4, 1982-83, p. 424.

The liability procedures currently used by NASA are sufficient while the U.S. Government operates the shuttle, the shuttle crews are small and well-disciplined, and commercial insurance is available.[105] As space activities become more complex and numerous, existing procedures will have to be reexamined.

- **Medium-term solutions (government space stations).** Liability issues on the first generation of government-owned space stations could be handled by using the methods similar to those NASA now employs on the shuttle. The space station owner and operator, whether it be one nation or a consortium of nations, could require all other nations to waive their right to sue each other and require all participants to self-insure or purchase commercial insurance for third-party claims.

As space stations grow in size and complexity and become staffed by civilian employees, it will probably be necessary to develop more flexible rules for compensating individuals injured in space. A logical next step might be to negotiate international agreements similar to the NATO Status of Forces Agreements that would designate which nation's laws would apply in which situations. As mentioned above, it is not clear whether all national courts would feel constrained to respect these contracts.

- **Long-term solutions (private space stations and beyond).** Eventually, space travel will be quite common and individuals may visit neighboring space stations much as we now visit neighboring countries. A rule could develop which places on the space traveler the burden to know the law of the place visited; that law would govern all civil and criminal actions resulting from the traveler's visit. Alternatively, nations may strive to achieve international uniformity in the application of 'conflicts rules.' The 1955 "Hague Convention on the Law Applicable to the Sale of Corporeal Moveable Objects" and the 1973 "Hague Convention on the Law Applicable to Products Liability" are examples of such attempts.[106] In the 1973 Products Liability Convention, nations agreed to apply the law of the habitual residence of the victim, or subsidiarily, the law of the place where the damage has occurred. Similar international agreements for applying Earth law to space activities may be necessary. Finally, nations may attempt to create a uniform substantive tort law system for activities in outer space.[107]

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[105] There is considerable concern about the long-term health of the space insurance industry. *See:* "Insurance and the Commercialization of Space," Senate Committee on Commerce, Science, and Transportation; 99th Cong., 1st Sess., S. Print 99-16, March 1985.

[106] P.P.C. Haanappel, "Product Liability in Space Law," *Houston Journal of International Law*, vol. 2, No. 1, autumn 1979, p. 61.

[107] Interntational aviation law conventions such as Warsaw (49 Stat. 3000; T.S. 876; LNTS 11) and Rome (310 U.N.T.S. 181) might serve as models.

Part II
Workshop Proceedings

I - CHALLENGES AND OPPORTUNITIES

A. Introduction

In April 1985, the Subcommittee on Science, Technology, and Space of the Senate Committee on Commerce, Science, and Transportation requested the Office of Technology Assessment to prepare a background paper that would examine the legal issues resulting from space station activities.[1] Having completed a draft of this report, OTA held a workshop on May 2, 1986 to review the findings of the draft and to investigate other related issues. The workshop participants included lawyers from NASA and the European Space Agency, as well as legal experts from Canada, the Federal Republic of Germany, and Japan. In addition, a wide range of U.S. legal experts from academia, industry, private practice, and the government also attended.

Throughout the day-long workshop many legal issues were discussed and aggressively debated. No attempt was made to reach a consensus on particular issues, although in some cases agreements on fundamental principles evolved spontaneously. Most significantly, the panel agreed that:

1) Multinational space station activities will raise fundamental legal issues. The laws we take for granted on Earth--e.g., those that regulate commerce, property, criminal activity, and personal interactions--may not be available in space or may conflict with similar laws held by other nations.

2) The United States should not attempt to fashion a novel 'space code' to cover all space station activities; rather, legal problems should be solved incrementally by the careful application of intergovernmental agreements, congressional action in the form of legislation, and, finally, the decisions of the highest courts of the land.

3) Determining jurisdiction (i.e., deciding which nation has the right to make and enforce rules of law) is the single most important legal question to resolve in the planning stage for the first space station. Although a legal concept, jurisdiction with respect to an international space station will involve important--and sometimes overriding--technical and foreign policy considerations.

4) Under the Constitution of the United States, most laws affecting

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[1] Letter from Senators John C. Danforth, Slade Gorton, Ernest Hollings, and Donald W. Riegle, Jr., Senate Committee on Commerce, Science, and Transportation, to John H. Gibbons, Director, Office of Technology Assessment, Apr. 22, 1985.

the rights of individuals (e.g., personal injury, contracts, property, wills and estates, employee's compensation, etc.) are State laws, not Federal laws. Since the substance of State laws varies considerably, it is essential that the jurisdiction of State courts and the applicability of State law to space station activities be determined clearly.

Although there was agreement on these general points, there was strong *disagreement* over which specific issues needed to be examined first and whether those issues needed to be resolved now or when they resulted in a mature case or controversy.

This report documents the issues that were discussed, the agreements and disagreements that surfaced, and the advice and words of caution offered by the participants during the workshop. It is--and on this point all the participants would agree--merely an early step in a long process that will require the close attention and hard work of talented individuals in the executive, legislative, and judicial branches.

B. Priorities in Decisionmaking

The panelists generally agreed that there was a wide range of legal issues to be addressed and that the resolution of these issues should be thought of as a process in which some things needed to be done now while other things could be done later. Nonetheless, there was substantial disagreement over the severity of specific problems and over the list of problems which required immediate attention. The wide range of viewpoints on this subject resulted, in part, from the fact that the panelists took three different approaches to the problem:

- ***Technological approach*** - Some panelists took the position that the legal issues could not be adequately addressed without first understanding the technology involved in a manned space station. They stressed that once one understood the physical structure, the unique demands, and the purpose of the space station, certain issues would tend to resolve themselves. For example, some theoretical problems of jurisdiction might turn out to be irrelevant if safety issues were to dictate a specific type of centralized control. Likewise, advanced communication and control technologies that would permit nations or private firms to transfer information to their own ground stations might go a long way toward resolving some troublesome intellectual property problems. These panelists maintained that once one understood space station technology, then one could establish an appropriate institutional arrangement. Once the institutional arrangement was in place, additional legal issues could be resolved through a variety of means including agreements between the concerned parties and appropriate domestic legislation.

- ***Political approach*** - Other panelists argued that the political issues surrounding the space station were the most important. They suggested that one had to first determine whether the space station was going to be a U.S.

space station with international participation or a truly international space station. Once one reached common ground on the institutional arrangement, then one could discuss the technical and the legal implications. They suggested that since jurisdiction was the most significant single legal issue, it must be resolved first, and that resolution of the jurisdiction question would clear up many other issues.

o ***Incremental or 'practical' approach*** - The majority of the participants took an incremental or practical approach to resolving legal issues. They pointed out that certain problems would result from the technologies chosen for the space station, others would result from the institutional arrangement chosen by the parties, and still others would be generic to all space activities. They noted that it is difficult for lawyers to work without facts, and suggested that only with operational experience could the true nature of certain legal problems be understood.

They thought that many of these problems would be resolved through a series of unrelated international agreements, domestic legislation, and private contracts. As time passed, other unique problems would arise but these could be resolved on an *ad hoc* basis using the legal tools that were developed incrementally.

C. Responsive v. Preventive Legislation

Advocates of the 'incremental' approach were almost evenly divided on the question of whether domestic and international law should respond to immediate problems or attempt to prevent problems from occurring. Some argued simply that: "If it isn't broken, let's not fix it;" others responded that we already had a pretty good idea of where the system was going to break down; therefore, we ought to work to prevent this from happening.

1) The arguments for responsive legislation

Those who supported responsive legislation often did so because they thought that law should not race too far ahead of experience. One panelist pointed out that, "a space station is at least...8 years away. Even as slowly as Congress sometimes works...many of these [issues] are going to be [resolved]." The panelist noted that although we already know that certain issues, such as criminal law and jurisdiction, will need to be resolved, "We can better address [these issues]...once we really know what...the space station is going to be."

Other panelists expressed concern that attempts to develop domestic laws and international agreements in advance of real problems might unnecessarily restrict our future options. Citing the specific example of patent law, one panelist noted, "that's fine for the shuttle because the shuttle is flying and, in fact, some inventions have already been discovered as a result of the shuttle...[But] maybe you will not want the same kind of legislation [for the space station]."

Another panelist concurred, noting that one might not want the same rules and regulations for a space station used solely for government research and development as one would want for a purely private sector space station engaged in commercial operation. The panelist argued that we may not want arrangements for this space station to govern our activities on other future space stations: "...the arrangements we work out for this particular space station--which will...[reflect]...how a particular set of governments decides it wants to handle these matters--need not govern...another space station that the U.S. puts up...with a completely different set of governments."

Supporters of responsive legislation believed that the majority of potential legal problems could be resolved by the interested parties through the use of intergovernmental negotiations or private contracts. Although acknowledging that one needed a "backdrop of tort law, criminal law, [etc.] that you...take for granted here on the ground...," one representative from the business community maintained that, to control liability, "I would look first at the contractual area...negotiating a relationship with the government, with other contractors, that laid out in very great detail who would suffer what loss in what eventuality." The panelist noted, "the inter-party waiver of liability that NASA has in its launch service agreement...does a very good job of...creating a lawyer's anti-employment act. It really does force parties to face up to the fact that they might lose what they are investing, and that they have to accept that." One of the disadvantages of this approach is the high cost and limited availability of insurance, "But on the other hand, it really sets out things pretty clearly, and that's a big advantage for a business."

The panelist urged a practical approach: "look at exactly what's involved in the space station, the fact that you have fewer people on the station than you have in this room...[that all are healthy, pre-screened, and constantly monitored]...Put all that together and I think you have the kind of situation where the contractual issues really take on a great predominance. ..You don't expect to have crimes," he argued, "You don't expect to have torts."

The panelist ended by recommending that the laws for the space station be based on contract and negotiation supplemented by national laws (for criminal law, tort law, etc.) and international arbitration as the need arises.

2) The arguments for preventive legislation

Many panelists rejected the notion that legislation should merely respond to, rather than try to prevent, problems. They contended that such a policy would: 1) increase uncertainty thereby decreasing the private sector's interest in investing in space; and 2) offer no guidance on which, if any, of the laws currently on the books in the United States (the so-called 'legal backdrop' acknowledged as necessary by the proponents of responsive legislation) would apply to space station activities.

Panelists representing the U.S. firms interested in doing research in space stressed that: "In regard to some of these issues, [e.g., intellectual property, product liability, and antitrust], American business would take the position that you [must act] now." Although the space station is 8 years away, "business decisions are being made today that will impact the space station, how it operates, under what laws it operates and those decisions can't go a'begging or the station will get up there and it won't have any customers or inhabitants other than the lawyers maybe, still arguing [these] point[s]."

According to one panelist, legal advice is an integral part of the decisionmaking process in his company: "There isn't a division operating committee meeting...that goes by that I don't give some advice at a very early and formative stage in respect to some new product ...Whether the first step should be taken, oftentimes, will depend on what legal opinion I give them..." He stressed that U.S. business: "Can't wait for the scientists to figure it out or until the marketing people decide how best to sell it." Other panelists representing the private sector declared that they wanted to have certain ground rules made clear, such as how intellectual property would be protected or what would be a company's recourse in the face of industrial espionage by nationals of another country.

Although these panelists said they understood the importance of allowing certain legal rules to evolve over time, they emphasized that a balance must be struck that recognized business' need for certainty. One panelist said that his firm could operate without "certainty," but that they would like some "reasonable expectation of what would result if a legal dispute arises." At a very minimum, they would like to know which *countries*' laws were going to apply.

Some panelists stressed that we need to acknowledge that we are making decisions and developing principles that will have a strong influence over our future activities. These panelists rejected the notion that the *ad hoc* agreements entered into and the legal principles developed for this space station will not bind us in the future. "We should proceed as though what we do now will be at least considered in future negotiations," the panelist explained, "there will be the usual disclaimers [saying that these decisions apply only to this first space station], but...as a practical matter we need to proceed as though we are [establishing important precedents]."

Panelists generally agreed that the two most important domestic issues for the United States would be: 1) which State's laws would apply in a particular situation; and 2) which current laws would apply to space without special legislation. Although neither of these concerns necessarily involves the development of new legislation, they both present serious problems. For example, product liability law varies substantially from State to State. If a person from Nevada is injured on the space station by equipment manufactured aboard the space station by a Delaware corporation, which State has jurisdiction over the injury and which State law does the judge apply?

In addition, there has to be a way to determine which of the hundreds of existing laws that might be applied to the space station should be so applied. For example, we know that the Fair Labor Standards Act does not apply to NASA employees, but does it apply to other space workers? If it does apply, are these people limited to an 8 hour work day on the space station? Furthermore, what about the Federal Tort Claims Act, Buy-America Act, U.S. export laws, patent laws, tax laws, and literally hundreds of other pieces of legislation? How do we go about determining which of these many Federal as well as State laws apply?

In order to answer these and many more similar questions, advocates of preventive legislation argue that Congress should undertake a thorough assessment of current Federal and State law. This assessment would determine which laws should be extended to the space station and which were limited to the territory of the United States, and would clarify the role of State law with respect to space activities.

D. The Utility of Analogies

Since the beginning of the space age, lawyers have debated whether and to what extent the principles of international and commercial law already found in air and maritime law could be applied to outer space activities.[2] Workshop participants agreed that the legal principles embodied in air and sea law could not be transferred wholesale into the realm of space, but disagreed over value of air and sea law principles as analogies to assist in the development of a unique body of space law.

Some panelists objected in principle to the use of analogies, stating that all analogies were misleading. Others objected on the more specific grounds that analogies did not take into consideration the technological and political circumstances unique to the space station. For example, they pointed out that the multinational nature of the space station has no corollary in the air or sea, and that fundamental concepts such as state sovereignty in national air space, the partially demilitarized nature of outer space, and state responsibility for national space activities were not interchangeable.

One panelist differed, saying, "Space is very much like the high seas. Space objects are already very much like vessels on the high seas...Oceans and space are both media for transportation, communication and they are both repositories for resources." Although the panelist admitted that, "...there is a good deal of need for caution in trying to go too far with the analogy between maritime law and space law," he suggested that the way current maritime law applies to vessels might offer some useful insights with respect to questions of jurisdiction over space stations.

Another panelist suggested that analogies, although defective in certain respects, were useful for regulating interpersonal relationships. How nations compensate injuries, keep track of and transfer personal property, delegate authority, and punish minor wrongs on the space station need not differ substantially from how these issues are resolved in the air or on the high seas.

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[2] McDougal, *et al.*, *Law and Public Order in Space*, (Yale University Press, 1963) p. 227.

II - ISSUES THAT REQUIRE IMMEDIATE ATTENTION

The panelists generally agreed that some issues should be examined now, although they disagreed as to what the nature or goal of such an examination should be. The issues discussed below were identified by a majority of panelists as requiring immediate attention.

A. Jurisdiction and Choice of Law

Almost all legal disputes require that the parties answer three questions: *What nation has jurisdiction (the right to make and enforce rules of law) over a particular person, place, object, or issue? What court within that nation is the appropriate court to resolve the specific dispute in question? And, what is the appropriate law for this court to apply?* Given the multinational nature of space station crews and the modular nature of space station technology, jurisdiction and choice of law questions will need to be examined even before space station operations commence.

1) Jurisdiction

As discussed in the OTA background report (*supra*, p. 25), the concept of jurisdiction raises many complicated issues and may imply a number of different legal relationships. For example, nation A might have jurisdiction over a space station because the relevant multilateral agreement declares this to be the case. At the same time, the courts of nation B may have jurisdiction to adjudicate a specific case or controversy (e.g., where the citizens of nation B are involved or where activities have an effect on the territory of nation B, etc.) arising from activities conducted on nation A's space station.

a) Jurisdiction Over the Space Station

Several panelists were quick to point out that the question of which nation (or nations) has jurisdiction over the space station (or some part thereof) raises issues that are predominantly political and technical, as opposed to legal. For this reason, these panelists thought that it was unreasonable to assume that jurisdiction need be vested only in one nation. Others differed, saying that, particularly in the early years of station operations, multiple, perhaps competing, jurisdictions could make the space station unmanageable.

o ***The politics of jurisdiction*** - Some non-U.S. panelists noted that their countries did not wish to participate in a U.S. space station, only in an "international" space station. One panelist suggested that the goal of the current negotiations should be to reach "an agreement between equal partners," and that: "[We] want to remain fully responsible for...[our]... contribution to the international space station. That is to say, we'll retain jurisdiction and control over... [our]... contribution, but...[we are]... prepared to discuss...limitation[s]... [on this]... jurisdiction in order to permit the good functioning of the space station..."

In order to encourage the success of this shared jurisdiction approach, some panelists favored an *ad hoc* resolution of problems by contract rather than establishing more general rules of law which would be enforced by a recognized "authority." It was believed that this *ad hoc*, contractual resolution would discourage the idea that one nation had the power to enforce law and would encourage the belief that space station operation was a process of negotiated power-sharing.

The concern over jurisdiction stemmed in part from considerations of national pride and prestige, and in part from concern over protecting valuable information derived from research. Several panelists cautioned that their countries did not intend to provide space station modules dedicated to research only to find that the United States patent laws could be used to limit their exploitation of certain discoveries.

o ***Jurisdiction and technology*** - Other panelists noted that, politics aside, technology mitigated against one nation maintaining jurisdiction over an entire "space station." One panelist suggested that we should pay homage to the old Roman law axiom "*ex facto sacro lex*," which roughly translated means, those laws are best which respond to the facts. He warned: "Future space stations will not be single objects...they will be evolutionary objects...[or]...'object assemblies'." He pointed out that in addition to the core space station, NASA's current plans already assume companion elements such as free-flying platforms and other loose elements such as polar platforms. In the future, at least four classes of objects may exist on or near space stations: shuttle-type vehicles that service or supply stations, modules that are permanently attached, modules that may be attached and detached, and free-flying platforms in similar or intersecting orbits.

The panelist concluded that "the pluralistic and dispersed nature of space station assemblies...might lead...to the establishment of different ...jurisdictional precincts." This would require nations to acknowledge that "...the space station has outgrown the single object concept which is the basis of the Registration Convention," and that neither the Registration Convention nor the 1967 Outer Space Treaty contains an adequate working definition of the term "space object."

Another panelist countered that although the Registration Convention declared that only one state could register a space object, it allowed separate agreements on jurisdiction and control. "[S]uch an approach ...[has]...considerable practical advantages," the panelist argued, "Mainly it would prevent the unnecessary fragmentation of a space station assembly into numerous national territories."

b) Jurisdiction Over Cases and Controversies

Putting aside for the moment the question of which country (or countries) would be designated by the space station agreement to exercise sovereign jurisdiction, questions of how to determine a court's jurisdiction over specific cases and controversies must also be addressed. One panelist pointed out that the U.S. experience with the First Restatement of Conflicts showed that attempts to devise jurisdiction-selecting rules in advance were "inherently futile." Such rules "though they fly the banner of certainty, in fact...[create]...great uncertainty as courts and businesses try to...escape from the inflexible dictates of those...rules." This led the panelist to conclude that we: "not only cannot but should not identify with any precision which jurisdiction's rules should govern in advance."

The workshop participants did not attempt to resolve the question of whether jurisdiction selecting rules were desirable; they did, however, point out that treaties and other international agreements, private and quasi-private contracts, and arbitration might all be used to designate jurisdiction in advance. One panelist cautioned that because jurisdiction involved the power of the state, private contracts which seek to limit a state's power have often been held in disfavor.

An alternative to the case-by-case negotiation of jurisdiction might be to entrust some international body of experts such as the International Law Commission, the Hague Conference on Private International Law, or the United Nations Committee on the Peaceful Uses of Outer Space to develop general principles in this area. Several panelists disagreed with this approach, stating that attempts to develop such rules in advance of actual cases and controversies would be ill advised. They suggested that the simplest and most practical approach was to encourage the slow development of customary law.

2) Choice of Law

a) International Issues

International law does not attempt to instruct courts as to which body (or bodies) of law should be applied to cases and controversies arising from space activities. Both the Outer Space Treaty and the Registration Convention declare that a nation has jurisdiction over space objects that it registers but neither treaty attempts to address the choice of law question.

During the workshop, representatives from the business community stressed that it was important to their firms to know, in advance, which nation's--and in the United States, which State's--laws would apply. One panelist noted that, in its business contracts, it always specified which State's law would apply, so that in case of a dispute the firm had a clearer understanding of the laws with which it would be dealing. Such specificity, it was noted, would be desirable in space activities as well.

Another panelist argued that business' desire for certainty might be at odds with the concept of fairness; that is, "the idea that choice of law should somehow vindicate fundamental state interests even if you can't tell in advance which state will be the most interested or which interests will be the most worthy."

Panelists identified many possible solutions to the "conflict of laws" question. One could apply: 1) the law of the state of registry; 2) the law of the forum where the plaintiff brings the case; 3) the law of plaintiff's nationality; 4) the law of the defendant's nationality; or 5) principles of law common to both jurisdictions (an extremely difficult administrative task). Alternatively, one could follow the U.S. corporate model and allow one jurisdiction, such as Delaware, to emerge as proper or convenient referent for choice of law. As with the question of jurisdiction, the workshop participants examined a set of alternatives without attempting to determine which would be most advantageous.

In addition to identifying particular "conflict of law" rules, the panelists also examined the following range of methods for securing their acceptance by the appropriate parties:

o *Private or quasi-private contracts* - Many participants thought that private or quasi-private (such as the NASA launch agreement) contracts were the most practical solution since they would allow the relevant parties to design rules to govern specific activities and technologies.

o *Arbitration* - Whether specified in private contracts or expressed more generally in international rules such as the International Chamber of Commerce Rules[3] or the rules of the United Nations Committee on International Trade Law (UNCITRAL),[4] panelists generally believed that arbitration provided a flexible alternative to preestablished "conflict of law" rules.

o *Treaties or other international agreements* - Several panelists noted that nations could attempt to determine in advance whose laws would apply to specific situations by negotiating formal multinational agreements. Although most panelists did not seem to have high confidence in this approach, one panelist pointed out that, since a treaty would be the "supreme law of the land" in the United States, the United States might use a treaty to ensure conformity not only among the signatories but also across the 50 States.

o *U.S. statutes* - Since most other nations would object to U.S. attempts to limit the jurisdiction of its courts, U.S. statutes would be of limited utility for designating jurisdiction. U.S. laws might be more useful for designating the applicable law in cases involving U.S. nationals. The United States might use its laws to declare that all U.S. activities on the space station would be governed by the law of one State (e.g., Delaware or the

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[3] "In absence of any indication by the parties as to the applicable law, the arbitrator shall apply the law designated as the proper law by the rules of conflict he deems appropriate."

[4] "Failing designation of the applicable law by the parties, the Arbitral Tribunal shall apply the law determined by the conflict of law rules which it considers applicable."

District of Columbia).

o *Customary law* - Instead of trying to solve "conflict of law" problems in advance, nations might make the decision to handle problems on a case-by-case basis and encourage the development of a customary law of space conflicts. Such a course might be chaotic at first, but could stimulate creative solutions to traditional problems. One might allow different choices of law for different issues--e.g., one for criminal law, one for patent law, etc. Alternatively, one might encourage the practice of "depecage," the dividing of a single action into different parts, each controlled by a separate law.

o *"No Law" solution* - One panelist pointed out that in the early years of space station operations one attractive alternative might be a "no law" solution where each party accepts its own losses. Such a regime would be similar to the current NASA policy of requiring shuttle customers to waive the right to sue each other for damage to payloads. Another panelist noted that "no law" might work if the only thing at risk was the property of two space station participants; however, as soon as the law of interpersonal relations was considered (torts, wills and estates, workmen's compensation, etc.) one needs a much more sophisticated legal regime. A representative from industry objected to the "no law" approach because it would be impossible to predict the result of a legal action and therefore lacked the certainty (or at least predictability) so valued by firms.

b) Issues for the United States

The panelists were in general agreement that the two most important issues for the United States were: 1) how to decide which of the Federal and State laws currently on the books would apply to space activities; and 2) how to resolve conflicts that arise between Federal and State laws or between the laws of the various States.

i) Which Laws Apply?

As noted in the OTA background report (*supra*, p. 33), Congress has recently been trying to determine whether the patent laws of the United States currently apply in space. In 1981, Congress faced this same question with respect to Federal criminal law and decided to amend the U.S Criminal Code to remove any confusion on this point. These two examples illustrate the dilemma which must be resolved for dozens of other pieces of legislation. In each case the following questions must be asked: *Is it desirable for the law in question to be applied to space activities? Can the law, as currently written, be interpreted to apply to space activities? And, what legislative or regulatory modifications will be necessary to ensure that the protections of the relevant law are available to, or denied, U.S. nationals operating in space?*

Several panelists stressed that successful space commerce would depend on the extension to space of many of the laws we currently have on Earth. For example, one panelist noted that the Uniform Commercial Code is essential to commerce in the United States, yet many of its provisions when applied to the space station would raise questions (*How do we define personal property in space? Real estate? What is moveable, immoveable?*) that might require legislation to resolve.

Some legislation, such as the Fair Labor Standards Act, would come with restrictions--such as the 8 hour work day--which might seem inappropriate to space. On the other hand, legislation such as the Death on the High Seas Act might be desirable since it could be used to remove wrongful death actions from the jurisdiction of States, thereby solving in advance the problem of conflicting State laws.[5]

One panelist stressed the need to resolve these questions before space station operations get underway. "It's well enough to say that we have to have a scientific understanding of these objects [before we address the legal problems]" he noted, "but when somebody dies up there and their next of kin brings a lawsuit in one of the district courts of the United States, the issue is going to [be] *'what law applies?'* because the law is different in 50 jurisdictions plus the Federal Death on the High Seas Act...The law isn't going to wait until we get everything in a very nice, beautiful pattern so that we can flesh it out with beautiful laws that nobody objects to. People are going to be sued."

The panelist maintained that such problems must be resolved if we are going to protect the space worker. "A lot of those people working up there are going to be workers just like [Earth]-based workers. They're going to want to know whether they're entitled to Federal compensation under workman's compensation laws which are very liberal or whether they're confined to state workman's compensation laws which are much less beneficial."

Another panelist agreed, pointing out that arbitration, a preferred means for resolving conflicts between private firms or governments, does not work in personal injury cases. In many instances, the injured party will not even be party to the arbitration agreement.

ii) Choosing Between Federal and State Laws and Between the Laws of the Various States

In the United States, Federal courts have primary and sometimes exclusive jurisdiction over a limited number of issues. However, U.S. laws covering topics such as personal injury (tort), contract, property, secured transactions, wrongful death, wills and estates, etc., are predominantly State law. Under the doctrine of *Erie v. Tompkins*, when a Federal court hears a case on one of these issues it applies State law and not Federal law. In space it will be necessary to determine not only the power of States to pass laws affecting space activities, but also, since State laws vary substantially, to establish rules to help the Federal courts determine which of several State laws would apply in a particular instance.

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[5] The wrongful death statutes of States differ considerably. Many States use a strict liability standard for wrongful death, while others use a negligence standard. Potential conflicts would be avoided if the Federal law were held to control. The Death on the High Seas Act limits recovery to pecuniary losses. The wrongful death statutes of many States allow for loss of consortium or anguish of next of kin.

In order to avoid confusion, some panelists suggested that it might be easiest to declare that one law applies (e.g., the law of the State of Delaware) and, in essence, create a surrogate Federal law.

One panelist pointed out that two recent pieces of legislation--The Outer Continental Shelf Lands Act,[6] and The Deep Water Port Act[7]--offered a possible precedent for the space station. In these acts, the question was how to apply U.S. jurisdiction, including municipal law, to artificial islands or floating rigs that were beyond the territorial jurisdiction of the United States. This was a problem because many Federal statutes (e.g., the Federal Tort Claims Act, NASA Act, etc.) explicitly incorporate State law or do not preempt State law. To resolve this problem and supply the necessary municipal law, Congress declared State law to be surrogate Federal law by maintaining that the law of the adjacent State was the relevant State law. Although no State could be determined to be physically adjacent to the space station, it would be possible to pick some State arbitrarily and declare that its laws apply.

B. Protection of Intellectual Property

The need to protect intellectual property was identified as one of the most significant and yet unresolved space station issues. Panelists generally agreed that, at least in the near term: "The real money...is going to come from knowledge we get from space, and that knowledge is going to be something that [the] partners will wish to keep to themselves." This subject was seen as having a significant effect on many aspects of the space station agreement, the technical design of the space station, and the international and domestic laws of the partners.

One panelist suggested that: "a foreign government might not wish to bring all of its technical data and its skilled people back through an American receiving point if, in fact, there is a dispute about who owns trade secrets, or patent rights...[because]...bringing it back to U.S. jurisdiction might give the U.S. Government, or a private citizen acting through a lawsuit, the right to seize those goods." This, it was suggested, might lead to the desire to develop technological solutions, such as the ability to broadcast encrypted data from the space station to the relevant country.

One U.S. representative noted that the issue was not simply space station operation; he was "very concerned that...the United States...not lose its superior position in...technological advancement," because it is research that drives technology development and economic competitiveness. The panelist noted that it was the management philosophy of his firm to assume risk and to support innovative ideas, but this meant that intellectual property was a prime asset of the company. He noted that his firm had spent $500 million in research and development in 1985, and that over the years, 25 percent of his company's sales had been generated by products which did not exist 5 years ago. This commitment to research, he implied, could not be maintained if there were no way to protect that investment.

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[6] 43 U.S.C. 1331, *et seq.*

[7] 33 U.S.C. 1501, *et seq.*

Several other panelists from the United States identified three independent aspects of the intellectual property problem:

o ***Current NASA practices*** -
When NASA enters into a Joint Endeavor Agreement with U.S. firms, it expects to get access to that firm's equipment for a certain number of flights. One panelist noted that: "inevitably in letting NASA use your hardware and make it work, there may be the need to transfer some background technology which is really a result of all the years of work that have gone into the development of the experiment that you paid for out of your own private stockholders funds." This raised, in the minds of several panelists, questions regarding the government's right to demand access to background technology and how this right would be exercised on the space station.

NASA also retains the right to use discoveries made by the private firm if the firm does not take advantage of such discoveries in a reasonable time. Some panelists objected to the use of such "march in rights" clauses. Others thought that such clauses were not a problem since they were meant to protect the public's investment in space and that sufficient controls existed to protect the firms.

o ***The international nature of the space station*** -
Panelists from all the countries represented at the workshop expressed concern over the problems inherent in protecting intellectual property in the crowded and much used laboratories of the space station. Some panelists thought that the problem of international crews might be managed by limiting the astronauts' training so that they could do the experiments without comprehending the proprietary technology. One panelist observed that: "There is more to an invention than just knowing how the knobs work." Therefore, he felt that these problems would not inhibit corporations from doing some R&D in space.

Other panelists strongly disagreed. They pointed out that this was not like doing research on the shuttle. The ideal situation would be to have researchers on the station for extended periods of time so that they could try a variety of different experiments, not just turn a few knobs and then come back to Earth to examine the data. This could not be done by partially educated astronauts. Some suggested that this problem might be resolved if firms could send their own researchers to the space station much as McDonnel Douglas did when it conducted its electrophoresis experiments on the shuttle.

o ***The nature of the U.S. intellectual property laws*** -
Some panelists thought that U.S. laws might have to be modified to protect intellectual property in the unique space station environment. One panelist noted that on a crowded space station it would be so difficult to

maintain secrecy that one might run into a definitional problem. "If I sit here with you looking over my shoulder and start writing out my formula," he suggested, "I can't really claim that it's a trade secret [because under current U.S. law] I haven't really protected it."

Other panelists worried about the lack of recourse for thefts of intellectual property by nationals of other countries and suggested that such considerations should be addressed in the space station agreement.

C. Consistency in the Legal Regime

The operation of multinational space stations and the development of space commerce will increase the likelihood that new domestic laws and international agreements will need to be developed. Many panelists warned that care should be taken to ensure that such new rules and regulations were consistent not only with existing laws but also with broader national economic and foreign policy goals.

1) U.S. Law

As the OTA background paper points out (*supra*, p. 38), small inconsistencies have already appeared in U.S. laws dealing with space. For example, Federal criminal laws apply to vehicles recorded *"on the registry of the United States*," but the recent patent legislation (H.R. 4316) would apply to vehicles under the *"jurisdiction or control"* of the United States. Panelists cautioned that such discrepancies could result in unforeseen problems, particularly since the Registration Convention states that the person who registers a space object is considered to have jurisdiction and control except where other international agreements have been negotiated. Therefore, one might register a space object without retaining jurisdiction and control over it.

One panelist noted that since the Outer Space Treaty and other international space treaties use the language "jurisdiction and control," it was troubling to see the United States drafting legislation (such as the recent patent legislation and the 1984 Remote Sensing Act) using the language "jurisdiction or control." The use of the conjunctive "and" presumably implies--as it does in maritime law--that a nation must take some active steps to exercise jurisdiction. Put simply, "jurisdiction" is a set of rights and responsibilities and "control" is the acknowledgment and acceptance of those rights and responsibilities through a series of affirmative actions. Therefore, one could imply that a failure to exercise control might, in some manner, affect jurisdiction.

The panelist noted that the use of the disjunctive "or" was confusing. Was it meant to imply that either "jurisdiction" or "control" would be sufficient to allow the exercise of U.S. laws? More practically, if nations declare security zones around their space stations--a likely safety measure--would another nation's free-flyers come under the jurisdiction of the first nation while in that nation's controlled space? Other panelists thought that these questions could be resolved through careful drafting.

2) International Law and Policy

According to one panelist, contradictions have been avoided in international space law--including the INTELSAT and INMARSAT agreements--by incorporating in each instrument the fundamental provisions of the 1967 Outer Space Treaty. The panelist urged that this process be continued and suggested that domestic laws might be made consistent by repeating the fundamental principles found in the 1958 NAS Act. Alternatively, the panelist urged the development of: "some institution, some central focal point in the government, that is seeing to it that we do not pass space laws nationally that are in conflict with each other [or]...U.S. Foreign Policy and its connection with national security." Such a body might be similar to the old National Aeronautics and Space Council, in that it could have a highly trained, permanent staff that would overlook all these issues and call attention to the possibility of conflicts in national space laws.

Another U.S. panelist disagreed with this approach, arguing that the U.S. Constitution and the U.S. corporate laws supply all the direction we need. "[Rather than]...having a central clearing house that somehow puts a stamp of approval every time you make a law," cautioned the panelist, "you should develop laws for specific instances as they come about on a concrete case-by-case basis, only extending general principles...to the degree required to achieve the certainty to allow capitalistic institutions to finance these activities."

Although panelists disagreed on the value of international space laws--including the 1967 Outer Space Treaty--they agreed that, when necessary, such laws should be kept brief and used to establish general principles. Several panelists noted that the long and complex Law of the Sea Treaty offered an example of what nations should try to avoid.

III - FUTURE CONCERNS

Some issues discussed during the workshop were identified by the panelists as being important, though--due to technical or commercial considerations--not requiring immediate attention. Time did not allow a thorough examination of all of these issues; however, panelists identified product liability, export law, and civil procedure as deserving particular attention in the future.

A. PRODUCT LIABILITY

Most workshop participants felt that as long as there were no "made in space" products being marketed, and as long as space station crews were small and composed predominantly of government employees, most product liability questions could be handled by a creative use of contracts. Nevertheless, some panelists felt that as space research and commerce grow, so would the likelihood that people would eventually be injured or killed: 1) on the space station by products manufactured on Earth; 2) on Earth by products manufactured on the space station; and 3) on the space station by products manufactured on the space station. They believed that with the passage of time, product liability was destined to become a more important issue. Current international space laws (1967 Outer Space Treaty and the Liability Convention) discuss damage caused by space objects in a way that applies to states and intergovernmental organizations but has little relevance for private citizens. National product liability laws, on the other hand, apply to individuals but are, as one panelist pointed out, "a real zoo," varying not only from country to country but within the regions of individual countries. For this reason, several panelists felt there would be no clear legal recourse for individuals injured or killed on the space station.

Several panelists pointed out that national laws were consistent in neither the cause of action created by product liability nor the standard of proof required for the plaintiff to move his case forward. Currently, most jurisdictions rely on actions in tort for product liability; however, a minority have abandoned or relaxed privity[8] rules enough to allow actions to be based on contract even though there is no direct contractual link between the parties. With respect to the standard of proof, some States adhere to strict liability while others rely on negligence. Some panelists felt that this might make it difficult to develop consistent rules for the space station.

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[8] 'Privity' refers to the relationship between contracting parties. Actions in contract can, for the most part, only be brought by the parties to that contract.

In addition to conflicting national laws, the uncertain nature of space station jurisdiction and the possibility of multiple jurisdictions make the choice of law question extremely difficult for space station product liability cases. There are three multilateral instruments currently in force on product liability cases on Earth: the Hague Convention[9] to determine applicable "conflict of law" rules, the Council of Europe Convention[10], and the European Economic Community (EEC) Directive.[11] Some panelists thought these instruments could offer guidance on how to resolve similar problems that might arise on the space station. For example, nations could, following the EEC Directive, enter into an agreement to modify their national laws to adopt a strict liability standard of proof for all product liability cases arising from the space station. In addition, such an agreement could also allow nations to establish a ceiling on financial settlements.

Some panelists disagreed that existing conventions offered much in the way of guidance: "To date, very little progress has been achieved in the adoption of worldwide international conventions dealing with substantive product liability law. It seems...quite unrealistic to hope for the early adoption of an international convention on product liability as it pertains to space stations."

Panelists identified the choice between "fault" (where the plaintiff must prove the defendant acted with "negligence") and "strict liability" (where the plaintiff need only prove that an injury occurred and that injury was caused by the defendant's product) as being a key consideration for space station-related product liability actions. One panelist pointed out that the Liability Convention applies strict liability for damage on Earth or in the atmosphere but uses the more relaxed fault liability concept for accidents or injuries in space. Several panelists stated that this division existed because a collision between two space objects would almost necessarily involve two space powers, and the drafters of the Liability Convention believed that the space powers would be in a position to determine fault. People injured in the air or on the ground, on the other hand, would be "innocent bystanders" who would lack the technical and financial resources to make such a determination.

Some panelists thought that a similar division would be appropriate for the space station: "for products manufactured in space and sold on the Earth...you might apply strict liability. But...on the space station, one might make the argument that all the people up there accept a higher degree of risk, and therefore, if there is an equipment malfunction...strict liability would not apply [and the plaintiff should have to prove that the defendant was negligent]."

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[9] The United States is not a party to this treaty.

[10] Ratified by only three members.

[11] In force beginning in 1988.

Another panelist disagreed, arguing that with regard to products made in space, "there should always be a finding of fault associated with it, as both the users and the producers are liable to be very technically sophisticated and capable of making these types of proof."

Still other panelists felt that the standard of proof which applies to the space station must be a political, not a legal choice. One panelist suggested that given the current legal environment in most countries: "It is totally unrealistic to go for an international instrument based on negligence. What is more realistic...is an instrument based on strict liability, but with a ceiling on financial settlements..."

With respect to product liability, certain panelists were of the opinion that: "space was just not the issue." They argued that space legislation could contribute little: "considering the situation of product liability legislation in this country today, any recommendation you make [with respect to the space station] to Congress on product liability will probably fall all apart, and so I'm not sure that there is anything specifically that could be done for space today until the whole issue of product liability in this country is resolved." Other panelists suggested that, in some areas, space offered no unique difficulties. One panelist noted: "A German manufacturer makes the decision whether he wants to market his product in the State of Texas, or in the State of California, or in the United States at all, and he makes that decision after he looks at the market, and he looks at his return, and he looks at the exposure he gets under the product liability law. And the same kind of analysis would go on [for space products]."

Others thought that problems such as product liability were too big to be solved with space legislation. "Businesses [are failing] because they can't get insurance because of their product liability, and it's a serious thing that's being addressed by Congress...space is just a little piece of that business; right now, a very, very small piece. [It does not make sense] to recommend...that there be special treatment for space..."

Still others strongly disagreed, arguing that, in the case of product liability, if these issues were not resolved in a more satisfactory manner than they have been on Earth, this will be a disincentive to industry. Although acknowledging that this was more of a problem for manufacturing rather than research, the panelists suggested that legislating some upper limits on liability for space products would be a constructive step. It was suggested that the Price-Anderson Act--used to address the liability question in the nuclear power industry--was an interesting model. Under Price-Anderson, private firms would buy as much insurance as was available and the government would agree to cover their liability over the available insurance, up to a statutory limit.

Although acknowledging that space was only a small part of some very large legal problems, several panalists expressed the hope that space commerce could be a "clean broom" for sweeping away many problems faced by the business community here on Earth. "I think we're at a unique point in history" offered one panelist, "We're able to not only fashion some rules under which we will live in space, but I think in doing so we also have the opportunity to fashion some changes in the rules under which we live here on Earth. Let [our legal activities] be a clean broom [that does more than] sweep some cobwebs out of space..."

B. EXPORT LAW

Panelists were virtually unanimous in their identification of export law as an important concern and they regretted its omission from the OTA paper. Most felt that the subject was too complicated to be discussed in the short time available at the workshop. Many expressed the opinion that a full day could be profitably spent on this subject. Some of the aspects of this problem that were identified as requiring further discussion included:

o ***Transfer of technical data between space station modules.*** Depending on how jurisdiction was allocated on the space station, transfers between national modules could be regarded as imports or exports. One panelist suggested that should technical information pass from, say, a Japanese module into a U.S. module: "it would be an import and once it's imported, if it's technical data, you have to have an export license for export to take it back out of the country." Others disagreed, arguing that most types of information passed between modules would not be technical data under International Trade in Arms Regulations (ITAR) or Commerce regulations.

o ***Equipment shipped through the United States to the space station.*** One panelist pointed out that bringing goods into the United States to be launched on the shuttle does not require an import license because of a special exemption granted to NASA. This exemption would not extend to other, perhaps commercial, launch organizations.

o ***Status of products made in space and delivered to foreign countries.*** Panelists identified a number of questions that could result from the shipment of "made in space" products to Earth. What would be the effect of the jurisdiction of the modules? The nationality of the producer? The fact that the product might first land in the United States on the shuttle and then be shipped to the ultimate destination?

o ***Transfer of subcomponents between nations for eventual incorporation in the space station.*** Under current plans, components ultimately destined for the space station will be manufactured in many countries. Several panelists felt that it was important to develop rules which allowed the easy transfer of space station components between nations.

o ***Multinational research and product development.*** The multinational nature of the space station could, as one panelist pointed out, lead to a situation where a German company and American company want to cooperate to investigate some technology, but, under U.S. law, the German company would not know if it could buy the product until after it was developed. Since the product does not exist now, there would be no regulation in the Commerce Department, the Department of Defense, or in the State Department that could be consulted, and these agencies would refuse to give an opinion letter in advance.

C. CIVIL PROCEDURE

In arguing against attempts to solve legal problems in advance, one panelist observed that the only penalty for not developing appropriate laws was conflict. Since the function of courts is to resolve conflict, the panelist felt that all that were required were appropriate procedures to grant courts the power they would need to conduct the case.

Other panelists noted that some State procedural laws would already apply to space station conflicts. For example, using the "Long Arm" statute of Texas, one could obtain jurisdiction over a person by service of process on the Secretary of State of Texas if that person has made a phone call or sent a letter or a telex into Texas.[12] Arguably, under Texas law, merely controlling the space station from the Johnson Space Center exposes all participants to Texas jurisdiction. This led some panelists to express the opinion that unless such State laws were restrained, they would have a disruptive effect on space station operations.

Pondering the inherent difficulties of conducting pretrial investigations (discovery, depositions, interrogatories, etc.) concerning space station activities, one panelist queried "How do I get discovery? How can I take testimony?" The panelist suggested that lawyers will need to examine records ("conduct discovery") that exist only on the space station, or to obtain testimony from individuals on the space station without bringing them down to Earth. If so, then new rules of civil procedure may be necessary which will supply the legal means to force parties residing in space to comply with specific court orders. If private lawyers are to bring lawsuits, then certain procedural mechanisms must be put in place. Several panelists suggested that this could be best accomplished by amendments to the Federal Rules of Civil Procedure and the Rules of Evidence.

However, one panelist warned that amending U.S. Federal Rules of Civil Procedure could run afoul of the Hague Conventions on the service of process and the taking of evidence abroad. These conventions declare that certain evidentiary procedures are the prerogative of the state. Therefore, foreign countries can forbid the sending of interrogatories or attempts to take depositions by the nationals of other states. The Hague Conventions could be seen as barring the taking of discovery on certain aspects of space station activities if part of the station was under the jurisdiction and control of another country. Arguably, if Congress passed new amendments to the rules of civil procedure, under the "Later in Time Rule," these would override the treaties in the United States. However, in the absence of multinational agreements, such laws would not be respected in other countries.

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[12] The U.S. Constitution requires that a person receive proper notice ('service of process') of judicial proceedings that affect his or her person or property.

Some panelists felt that procedural questions were not really a problem since everyone would have to come back through the United States on the shuttle. Once in the United States, they would be subject to discovery and service of process. Others suggested that such thinking was exactly what most troubled our space station partners. The idea that foreign space station participants might have to run a gauntlet of U.S. laws every time they landed on the shuttle was viewed as diminishing the possibility of successful international cooperation.

IV - CONCLUSIONS

Throughout the workshop, many panelists stressed that: 1) it was time to begin to examine the problems presented by the operation of multinational space stations; and 2) such an examination should proceed slowly, taking into consideration the technical demands of building large, permanently manned space structures, the political demands of multinational management, and the eventual need to establish a "backdrop" of laws and regulations necessary to protect the space worker.

Some panelists felt that INTELSAT offered a good example of how to approach the timing--though not necessarily the substance--of a multinational space station agreement. INTELSAT started slowly with interim arrangements that were essentially contractual joint ventures between the international partners and the initial manager, COMSAT. After 7 years of experience, a more definitive arrangement was negotiated and INTELSAT was given its own separate legal personality, privileges and immunities, an arbitral mechanism and so forth. Many panelists felt that it was important to ensure that early legal and administrative space station agreements contain the flexibility required to take advantage of the tremendous amount of experience the organization will gain in its first few years of operation.

Most panelists were skeptical of the need for new international treaties, but many thought that a systematic investigation of space station legal issues would reveal that creative multinational agreements or selective domestic legislation would be in order.

Finally, several panelists noted that when the first space-related cases begin to occur, the courts will look first to congressional declarations to resolve complex issues. In the absence of such congressional declarations, courts will be left to their own devices, creating law and applying--or misapplying--analogies from air law and maritime law. As one panelist noted: "if Congress has anything to say [on this subject], it had better make itself clear now."

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